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FOUNDATION MINING, LLC
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Appendix C – Indiana Bat Survey Report

Appendix D – Cultural Resource Information and Related Correspondence

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Appendix F – Compensatory Mitigation Plan

APPLICATION FOR DEPARTMENT OF THE ARMY PERMIT *(33 CFR 325)*	OMB APPROVAL NO. 0710-0003 EXPIRES: 31 August 2012

Public reporting burden for this collection of information is estimated to average 11 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Department of Defense, Washington Headquarters, Executive Services and Communications Directorate, Information Management Division and to the Office of Management and Budget, Paperwork Reduction Project (0710-0003). Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number. Please DO NOT RETURN your form to either of those addresses. Completed applications must be submitted to the District Engineer having jurisdiction over the location of the proposed activity.

PRIVACY ACT STATEMENT

Authorities: Rivers and Harbors Act, Section 10, 33 USC 403; Clean Water Act, Section 404, 33 USC 1344; Marine Protection, Research, and Sanctuaries Act, Section 103, 33 USC 1413; Regulatory Programs of the Corps of Engineers; Final Rule 33 CFR 320-332. Principal Purpose: Information provided on this form will be used in evaluating the application for a permit. Routine Uses: This Information may be shared with the Department of Justice and other federal, state, and local government agencies, and the public and may be made available as part of a public notice as required by Federal law. Submission of requested information is voluntary, however, if information is not provided the permit application cannot be evaluated nor can a permit be issued. One set of original drawings or good reproducible copies which show the location and character of the proposed activity must be attached to this application (see sample drawings and instructions) and be submitted to the District Engineer having jurisdiction over the location of the proposed activity. An application that is not completed in full will be returned.

(ITEMS 1 THRU 4 TO BE FILLED BY THE CORPS)

1. APPLICATION NO.	2. FIELD OFFICE CODE	3. DATE RECEIVED	4. DATE APPLICATION COMPLETE

(ITEMS BELOW TO BE FILLED BY APPLICANT)

5. APPLICANT'S NAME:
First - Terry Middle - L. Last – Dayton
Company – Foundation Mining, LLC
E-mail Address – tdayton@alphanr.com

8. AUTHORIZED AGENT'S NAME AND TITLE (an agent is not required)
First - Niprendra Middle - K. Last –Chakravorti
Company –Michael Baker Jr., Inc.
E-mail Address – hchakrav@mbakercorp.com

6. APPLICANT'S ADDRESS.
Address - P.O. Box 1020; 158 Portal Road
City – Waynesburg State – PA Zip – 15370 Country – USA

9. AGENT'S ADDRESS
Address - 4301 Dutch Ridge Road
City – Beaver State – PA Zip – 15009 Country – USA

7. APPLICANT'S PHONE NOs. W/AREA CODE.
a. Residence b. Business 724-627-2219 c. Fax

10. AGENT'S PHONE NOs. W/AREA CODE
a. Residence b. Business 724-495-4207 c. Fax

STATEMENT OF AUTHORIZATION

11. I hereby authorize, Michael Baker Jr., Inc. to act in my behalf as my agent in the processing of this application and to furnish, upon request, supplemental information in support of this permit application.

APPLICANT'S SIGNATURE DATE

NAME, LOCATION, AND DESCRIPTION OF PROJECT OR ACTIVITY

12. PROJECT NAME OR TITLE (see instructions)
Foundation Mine Surface Facilities

13. NAME OF WATERBODY, IF KNOWN (if applicable)
Named/Unnamed Tributaries to South Fork Tenmile Creek

14. PROJECT STREET ADDRESS (if applicable)
Address N/A
City - N/A State – N/A Zip - N/A

15. LOCATION OF PROJECT
Latitude: °N 39 degrees 51' 14"
Longitude: °W 80 degrees 19' 01"

16. OTHER LOCATION DESCRIPTIONS, IF KNOWN (see instructions)
State Tax Parcel ID N/A Municipality N/A
Section – N/A Township – Center & Jackson Range – N/A

17. DIRECTIONS TO THE SITE
Refer to Section 1.0 of the "Supporting Documentation".

18. Nature of Activity (Description of project, include all features)

Refer to Section 2.0 of the "Supporting Documentation".

19. Project Purpose (Describe the reason or purpose of the project, see instructions)

Refer to Section 3.0 of the "Supporting Documentation".

USE BLOCKS 20-23 IF DREDGED AND/OR FILL MATERIAL IS TO BE DISCHARGED

20. Reason(s) for Discharge

Refer to Section 4.0 of the "Supporting Documentation".

21. Type(s) of Material Being Discharged and the Amount of Each Type in Cubic Yards:

Type Amount in Cubic Yards	Type Amount in Cubic Yards	Type Amount in Cubic Yards

Refer to Section 4.0 and Figure 4-9 of the "Supporting Documentation" for descriptions of materials to be discharged & figures showing the lateral/vertical extent of filling.

22. Surface Area in Acres of Wetlands or Other Waters Filled (see instructions)

Acres _____ (Wetlands)

Or

Liner Feet _____ (Stream)

Refer to Sections 4.0 and 6.0.

23. Description of Avoidance, Minimization, and Compensation (see instructions) Measures taken to avoid the impacts (No Impact Alternatives) are presented, along with the alternatives analysis, in Section 5.0 of the "Supporting Documentation"; measures taken to minimize in Section 4.0; and compensation in Section 7.0. Cummulative impacts are addressed in Sect. 8.0.

24. Is Any Portion of the Work Already Complete? Yes ☐ No ☒ IF YES, DESCRIBE THE COMPLETED WORK

25. Addresses of Adjoining Property Owners, Lessees, Etc., Whose Property Adjoins the Waterbody (If more than can be entered here, please attach a supplemental list).

Address –

City – State – Zip –

Refer to Section 6.13 of the "Supporting Documentation".

26. List of Other Certifications or Approvals/Denials Received from other Federal, State, or Local Agencies for Work Described in This Application.

AGENCY	TYPE APPROVAL*	IDENTIFICATION NUMBER	DATE APPLIED	DATE APPROVED	DATE DENIED

See attachment to this form.

* Would include but is not restricted to zoning, building, and flood plain permits

27. Application is hereby made for a permit or permits to authorize the work described in this application. I certify that the information in this application is complete and accurate. I further certify that I possess the authority to undertake the work described herein or am acting as the duly authorized agent of the applicant.

SIGNATURE OF APPLICANT	DATE	SIGNATURE OF AGENT	DATE

The application must be signed by the person who desires to undertake the proposed activity (applicant) or it may be signed by a duly authorized agent if the statement in block 11 has been filled out and signed.

18 U.S.C. Section 1001 provides that: Whoever, in any manner within the jurisdiction of any department or agency of the United States knowingly and willfully falsifies, conceals, or covers up any trick, scheme, or disguises a material fact or makes any false, fictitious or fraudulent statements or representations or makes or uses any false writing or document knowing same to contain any false, fictitious or fraudulent statements or entry, shall be fined not more than $10,000 or imprisoned not more than five years or both.

BLOCK 26 ATTACHMENT

AGENCY	TYPE APPROVAL	ID NUMBER	DATE APPLIED	DATE APPROVED	DATE DENIED
PADEP – California District Mining Office	SMCRA Permit (proposed surface facilities except the railroad track sidings)	3081301	July 2, 2010	Pending	
	Coal Refuse Disposal – Alternatives Analyses	Sites CR-1B & R-3	March 12, 2008	August 18, 2011	
	Coal Refuse Disposal Permit(s)	Sites CR-1B & R-3			
	Stream Restoration Activities				
PADEP – Dam Safety	Dam Permits (slurry and water supply impoundments including associated sediment ponds if applicable)				
PADEP – SW Regional Office	Railroad – Chapter 105 Permit and 401 Water Quality Certification				
	Stream Restoration Activities - Chapter 105 Permit and 401 Water Quality Certification				
PA Fish & Boat Commission	Approval of Water Intake				
MSHA	Approval (slurry and water supply impoundments including associated sediment ponds if applicable)				
PennDOT	Highway Occupancy Permit(s)				
Greene County Conservation District	Railroad – NPDES/E&S Plan Approval				

Section 1.0

DIRECTIONS TO THE SITE (Block 17)

From Pittsburgh, follow Interstate 79 (I-79) south to Exit 14, Waynesburg. Turn west onto State Route 0021 (S.R. 0021) toward Waynesburg. Continue on S.R. 0021 through Waynesburg to the S.R. 0021 intersection with S.R. 0018 to the north. Continue on S.R. 0021 & S.R. 0018 (W Roy Furman Highway) to the point at which S.R. 0018 splits from S.R. 0021 and bears south onto Golden Oaks Road. The driving distance between I-79 Exit 14 and the S.R. 0021/Golden Oaks Road Intersection is approximately 9 to 10 miles. Turn left onto Golden Oaks Road (S.R. 0018) and continue approximately 2.5 miles to Holbrook.

Section 2.0

PROJECT DESCRIPTION (Block 18)

Foundation Mining, LLC (FMLLC) is planning development of a new mine in the Pittsburgh Coal seam. The new mine is referred to as the Foundation Mine and will be located in Greene County, Pennsylvania, within and around the town of Holbrook. See the location map presented as Figure 2-1. Coal produced by the Foundation Mine will be sold primarily to electric utility companies for use in electric power generation.

As shown on Figure 2-1, mine surface facilities needed for coal handling and processing will be located in and around the town of Holbrook. Figure 2-2 is an overview plan showing the facilities being proposed and their relative locations.

The portal area/shaft to be used for man entry into the workings of Foundation Mine will be located at the intersection of State Route (S.R.) 3020 (Bristoria Road) and S.R. 0018 (Golden Oaks Road). Coal will be removed from the mine via a slope entry located within the Hoge Run stream valley and will be temporarily stockpiled before being conveyed to the preparation plant for processing. The preparation plant and associated coal handling/storage facilities will be located on the hill/hillside bordering the slope area. Clean coal produced by the preparation plant will be stored temporarily in an area east of the plant before being conveyed approximately 2,150 feet southeast to a batch weigh facility for loading into rail cars and transport off-site. Water used for the coal cleaning operation will be obtained from a fresh water impoundment to be constructed in a valley along S.R. 0018 near the Woodruff Cemetery. The impoundment will be supplied with water conveyed from an intake structure to be located on South Fork Ten Mile Creek in the vicinity of the S.R. 0018 and S.R. 0021 intersection. Coal refuse generated by coal cleaning operations will be conveyed to disposal sites located in a valley west of the preparation plant facilities and in the Hoge Run valley area upstream of the slope facilities.

The proposed project area boundary for Foundation Mine surface facilities encompasses approximately 1,867 acres. Construction of the facilities listed below will involve stream and/or wetland impacts.

- Slope entry facilities
- Shaft facilities and adjacent supply yard
- Clean coal stockpile area
- Batch weigh/rail spur area
- Coal refuse disposal area haul road and equipment maintenance facility
- Water supply impoundment
- Water intake structure and water pipeline
- Coal refuse disposal areas
- Rail Siding

Therefore, the Federal action being requested is issuance of a Clean Water Act Section 404 Individual permit by the U.S. Army Corps of Engineers (USACOE) to authorize the placement of fill material within jurisdictional waters of the United States.

Section 3.0

PROJECT PURPOSE AND NEED (Block 19)

The basic purpose of the proposed project is to facilitate coal recovery. More specifically, the overall project purpose is further defined as the extraction, processing, and transportation of bituminous coal from Foundation Mine's Pittsburgh coal reserves. It is anticipated that the proposed facility will have an operational life of at least 20 years. The proposed Foundation Mine Surface Facilities will support expansion of the mine's coal reserves in the future.

Currently, approximately 46 percent of all electricity consumed by homes and business comes from coal. Even though development and implementation of renewable energy and natural gas for power generation is expected to gradually increase over time, global net electricity production by coal is expected to increase at a comparable rate. The Energy Information Administration forecasts that coal will remain the dominant fuel used for electricity generation through at least 2035. With American's demand for electricity expected to grow 30 percent by 2035, meeting the nation's growing demand for reliable, affordable electricity will require the continued utilization of all domestic energy resources. Also, relying on domestic coal strengthens American energy security.

Development of the Foundation Mine will help meet these current and future coal/energy production demands. As part of mine development, proposed surface facilities will need to be constructed to: 1) provide access to the coal reserves and underground mine operations, 2) process (i.e., clean) the coal, and 3) transport clean coal to market.

Section 4.0

MEASURES TAKEN TO MINIMIZE AQUATIC IMPACTS (Blocks 20, 21, & 23)

The magnitude and complexity of surface facilities associated with a new mine such as the proposed Foundation Mine presents a potential for impacting an area's aquatic resources. During site design for the Foundation Mine surface facilities, care was taken to avoid aquatic impacts where possible, and, where impacts could not be avoided, to limit them to the smallest practical extent.

Figure 4-1 is an overview of the Foundation Mine surface facilities layout showing proposed stream and wetland encroachments, i.e., aquatic impacts, within the project boundary. Table 4-1 summarizes proposed aquatic impacts by presenting a linear foot breakdown by stream classification and impacted wetland acreage.

A description of each "Impact Area" is presented in the following subsections along with the alternatives that were considered and measures that were taken to minimize aquatic impacts. Enlargement site plans for each impact area are presented as Figures 4-1-1A though 4-8-9. These plans detail and highlight each aquatic impact as discussed below. Figure 4-9 presents impacted stream profiles by impact area. Each impacted stream profile notes the stream name, classification, and summarized length of cut or fill in relation to the existing stream channel invert. Additionally, in fill conditions, the volume of fill material being placed within the existing stream channel cross section expressed in cubic yards (C.Y.) is calculated and noted.

4.1 SLOPE ENTRY FACILITIES

The slope entry is used to remove coal from the mine and for transport of equipment/supplies needed for the underground mining operation. Coal mined from the Pittsburgh seam will be transported to the surface through a slope entry. Underground mine design parameters necessitated locating the Foundation Mine slope entry within the Hoge Run stream valley. Additionally, the presence of Exceptional Value (EV) streams located to the west of the Hoge Run Stream valley eliminated development options within these areas. The Hoge Run stream is not an EV tributary and there are no EV streams present along the Hoge Run south valley wall where the majority of the construction will take place.

Hoge Run meanders through the valley in a sinuous pattern, leaving insufficient continuous valley bottom area for slope pad construction. To facilitate pad construction and minimize impacts to Hoge Run, FMLLC proposes to relocate the stream to a corridor along the northern side of the valley, away from the slope entry. The slope pad will be constructed along the southern valley wall and will encompass the remaining valley bottom area adjacent to the relocated stream. By keeping the pad and associated facilities on the southern side of the valley, proposed impacts to streams entering the northern side of Hoge Run were minimized. Impacts to stream channels on the southern side of the valley could not be avoided but were minimized by:

Table 4-1. Aquatic Impacts

AQUATIC IMPACT AREAS	WETLANDS		STREAMS				
	Wetland Name	Impact Area (Acre)	Tributary Name	Impact Length (L.F.)	Impact Length by Classification (L.F.)		
					Perennial	Intermittent	Ephemeral
SLOPE ENTRY FACILITIES							
No. 1 (Figure 4-1-1A & 1B)			Hoge Run (40632)*				
	F-52	0.040					
	Hoge-2	0.256					
No. 2 (Figure 4-1-2)			40632-O	75	0	18	57
			40632-N	120	86	0	34
			40632-N2	22	0	0	22
No. 3 (Figure 4-1-3)			40632-M	210	210	0	0
			40632-Q	171	0	0	171
			40632-R	160	0	0	160
No. 4 (Figure 4-1-4)			40632-EE	142	0	0	142
			40632-L	336	336	0	0
	Wetland A	0.028					
	Wetland B	0.001					
	Wetland C	0.106					
No. 5 (Figure 4-1-5)			40632-K	382	382	0	0
			40632-K12	189	0	189	0
No. 6 (Figure 4-1-6)			40632-J	1,775	1,528	0	247
			40632-J10	282	282	0	0
			40632-J11	367	273	0	94
			40632-J12	89	0	0	89
			40632-J13	169	0	0	169
			40632-J14	65	0	0	65
			40632-L1	20	0	0	20
			40632-L1a	17	0	0	17
			40632-L1a1	159	0	0	159
No. 7 (Figure 4-1-7)			40632-FF	264	0	0	264
No. 8 (Figure 4-1-8)			40633	199	199	0	0
	Hoge-1	0.128					
No. 9 (Figure 4-1-9)			40632-BB	238	0	80	158
			40632-CC	191	0	0	191
			40632-DD	317	0	39	278
			40632-I	517	517	0	0
			40632-I1	26	0	0	26
	F-44	0.004					
	F-45	0.024					
No. 10 (Figure 4-1-10)			Hoge Run (40632)	108	108	0	0
			40632-AAA	106	0	25	81
SUBTOTALS		**0.587**		**6,717**	**3,921**	**351**	**2,445**
HAUL ROAD & EQUIPMENT MAINTENANCE FACILITY FOR COAL REFUSE DISPOSAL AREA R3							
No. 11 (Figure 4-2)			40632-GG	92	0	0	92
			40632-H	342	0	0	342
			40632-H1	212	0	104	108
			40632-H1a	54	0	0	54
			40632-H2	33	0	0	33
			40632-H5	66	0	0	66
	F-21	0.052					
	F-22	0.012					
	F-28	0.009					
SUBTOTALS		**0.073**		**799**	**0**	**104**	**695**
CLEAN COAL STOCKPILE AREA							
No. 12 (Figure 4-3-1 & 4-3-2)			40635-L	1,627	1,519	0	108
			40635-L1	211	211	0	0
			40635-L1a	29	0	29	0
			40635-L2	599	381	73	145
			40635-L2a	70	0	0	70
			40635-L2b	130	130	0	0
			40635-L2c	96	0	0	96
			40635-L3	454	0	265	189
			40635-L3a	222	0	222	0
			40635-L4	370	370	0	0
			40635-L5	334	207	0	127
			40635-L5a	368	368	0	0
	Wetland E	0.037					
SUBTOTALS		**0.037**		**4,510**	**3,186**	**589**	**735**
SHAFT FACILITIES AND ADJACENT SUPPLY YARD							
No. 13 (Figure 4-4-1)			House Run (40635)	92	92	0	0
	F-4	0.023					
No. 14 (Figure 4-4-2)			40645-Q	204	0	0	204
SUBTOTALS		**0.023**		**296**	**92**	**0**	**204**
BATCH WEIGH FACILITY							
No. 15 (Figure 4-5-1)			40644	198	198	0	0
			40644-A	426	0	426	0
No. 16 (Figure 4-5-2)			40628-I	438	412	0	26
			40628-I2	153	0	0	153
			40628-I2a	54	0	0	54
	Wetland G	0.012					
SUBTOTALS		**0.012**		**1,269**	**610**	**426**	**233**
WATER SUPPLY IMPOUNDMENT AND ACCESS ROAD							
No. 17 (Figure 4-6-1A & 1B)			40645-R	111	0	0	111
			40645-S	155	0	0	155
			40645-T	20	0	0	20
			40645-U	128	0	128	0
			40649	3,431	3,372	0	59
			40649-R13	144	0	0	144
			40649-L19	343	0	343	0

Table 4-1. Aquatic Impacts

AQUATIC IMPACT AREAS	WETLANDS		STREAMS				
	Wetland Name	Impact Area (Acre)	Tributary Name	Impact Length (L.F.)	Impact Length by Classification (L.F.)		
					Perennial	Intermittent	Ephemeral
No. 17 (Figure 4-6-1A & 1B)			40649-L18	273	0	0	273
			40649-L17	621	0	0	621
			40649-R12	394	0	314	80
			404649-R12a	182	0	0	182
			40649-L16c	192	0	0	192
			40649-L16	905	480	167	258
			40649-L16a	218	0	0	218
			40649-L16b	206	0	0	206
			40649-R11	168	0	100	68
			40649-R9	350	0	0	350
			40649-R10	69	0	69	0
			40649-L15	233	0	64	169
			40649-L14	333	0	149	184
			40649-L13	464	398	0	66
			40649-R8	52	0	10	42
			40649-R7	80	29	0	51
			40649-R6	80	0	0	80
			40649-L11	247	0	0	247
			40649-L12	144	0	0	144
			40649-R5	249	0	111	138
			40649-L9	220	0	0	220
			40649-L10	126	0	0	126
			40649-L8	207	0	0	207
			40649-L7	194	0	0	194
			40649-L6	145	74	0	71
			40649-R4	115	115	0	0
			40649-L5	144	0	0	144
			40649-L4	206	94	0	112
			40649-R3	230	0	127	103
			40649-R2	209	0	0	209
			40649-L3	209	181	0	28
			40649-L2	134	70	0	64
			40649-L1	30	0	0	30
			40649-R1	15	0	0	15
	40649-W1	0.010					
SUBTOTALS		**0.010**		**11,976**	**4,813**	**1,582**	**5,581**
WATER INTAKE STRUCTURE							
No. 18 (Figure 4-6-2)			South Fork Tenmile Creek (40293)	46	46	0	0
SUBTOTALS				**46**	**46**	**0**	**0**
WATER SUPPLY PIPELINE							
No. 19 (Figure 4-6-3A, 3B.1 & 3B.2)			S. Fork Tenmile Cr. (40293)	0	0	0	0
			40627-E	15	15	0	0
			40628-K	15	15	0	0
			40629	15	15	0	0
			40630	15	15	0	0
			40628-J	15	0	15	0
			40628-A	15	0	15	0
			40628-Q	15	0	0	15
			Hoge Run (40632)	0	0	0	0
			40628-UNT11	15	0	0	15
			House Run (40635)	0	0	0	0
			40645	20	20	0	0
SUBTOTALS				**140**	**80**	**30**	**30**
COAL REFUSE DISPOSAL AREA CR-1B							
No. 20A (Figure 4-7-1)			40636	2,941	2,635	0	306
			40636-M	257	257	0	0
			40636-L	227	0	0	227
			40636-K	60	0	0	60
			40636-J	121	0	0	121
			40636-I	715	599	0	116
			40636-I4	245	0	61	184
			40636-I1	136	0	0	136
			40636-I3	122	0	0	122
			40636-I2	62	0	0	62
			40636-H	99	0	0	99
			40636-G	112	0	0	112
			40636-G1	51	0	0	51
			40636-F	90	0	0	90
			40636-E	189	0	0	189
			40636-D	224	165	0	59
			40636-D1	70	0	0	70
			40636-C	301	246	55	0
			40636-B	311	0	0	311
			40636-A	117	0	0	117
SUBTOTALS		**0.000**		**6,450**	**3,902**	**116**	**2,432**
COAL REFUSE DISPOSAL AREA R3							
No. 20B (Figure 4-7-2A, 2B, 2C and 2D)			40632 (Hoge Run)	6,831	6,808	0	23
			40632-AAA	23	0	23	0
			40632-H	223	223	0	0
			40632-H5	16	0	0	16
			40632-HH	194	0	194	0
			40632-GG	343	0	0	343
			40632-P	2,285	2,102	0	183
			40632-P1	590	0	0	590
			40632-P1a	182	0	0	182
			40632-P1b	215	0	0	215
			40632-P1c	338	0	0	338
			40632-P8	91	0	91	0
			40632-P6	335	0	0	335
			40632-P7	282	0	282	0
			40632-P5	324	0	19	305
			40632-P5a	87	0	0	87
			40632-P2	118	0	0	118
			40632-P3	114	0	114	0

Table 4-1. Aquatic Impacts

AQUATIC IMPACT AREAS	WETLANDS		STREAMS				
	Wetland Name	Impact Area (Acre)	Tributary Name	Impact Length (L.F.)	Impact Length by Classification (L.F.)		
					Perennial	Intermittent	Ephemeral
No. 20B (Figure 4-7-2A, 2B, 2C and 2D)			40632-P4	313	0	100	213
			40632-P4a	81	0	0	81
			40632-P4b	65	0	0	65
			40632-PP	314	0	0	314
			40632-OO	479	479	0	0
			40632-OO1	102	0	27	75
			40632-OO2	245	0	0	245
			40632-OO2a	60	0	0	60
			40632-NN	825	566	0	259
			40632-NN8	204	204	0	0
			40632-NN7	135	0	0	135
			40632-NN6	141	0	0	141
			40632-NN5	108	0	0	108
			40632-NN4	77	0	0	77
			40632-NN3	115	0	0	115
			40632-NN2	58	0	0	58
			40632-NN1	76	0	0	76
			40632-XX	379	379	0	0
			40632-WW	403	0	0	403
			40632-MM	119	0	0	119
			40632-VV	179	0	0	179
			40632-UU	421	0	100	321
			40632-LL	129	0	0	129
			40632-KK	205	0	0	205
			40632-JJ	2,381	2,092	244	45
			40632-JJ14	145	0	145	0
			40632-JJ13	289	0	68	221
			40632-JJ12	105	0	0	105
			40632-JJ11	89	0	72	17
			40632-JJ15	147	0	0	147
			40632-JJ10	108	0	108	0
			40632-JJ9	242	0	118	124
			40632-JJ8	165	0	165	0
			40632-JJ7	199	0	0	199
			40632-JJ6	245	0	92	153
			40632-JJ6a	70	0	0	70
			40632-JJ6b	102	0	0	102
			40632-JJ5	179	0	0	179
			40632-JJ4	107	0	0	107
			40632-JJ3	72	0	0	72
			40632-JJ3a	35	0	0	35
			40632-JJ2	99	40	0	59
			40632-JJ2a	72	0	0	72
			40632-JJ2a1	24	0	0	24
			40632-JJ1	50	0	0	50
			40632-TT	120	0	0	120
			40632-TT1	101	0	0	101
			40632-SS	251	0	0	251
			40632-SS1	89	0	0	89
			40632-RR	228	0	0	228
			40632-RR1	144	0	0	144
	F-19	0.025					
	HOG-3	0.168					
	R3-1	0.020					
	R3-2	0.022					
	R3-3	0.006					
	R3-4	0.146					
	R3-5	0.084					
	F-16	0.009					
SUBTOTALS		**0.480**		**23,682**	**12,893**	**1,962**	**8,827**
RAILROAD TRACK SIDING AREA							
No. 21 (Figure 4-8-1)			40643-O	92	0	0	92
			40643-G	136	0	0	136
No. 22 (Figure 4-8-2)			40647-T1j1	34	0	0	34
			40647-T1j3	60	0	0	60
No. 23 (Figure 4-8-3)			40647	85	85	0	0
			40646	51	51	0	0
No. 24 (Figure 4-8-4)	F-1	0.003		0	0	0	0
	GRI-1	0.050		0	0	0	0
No. 25 (Figure 4-8-5)			40643-B	114	84	0	30
No. 26 (Figure 4-8-6)			40628 -H	59	59	0	0
			40628-H3	76	0	0	76
			40628-H4	88	0	88	0
	Wetland F	0.023		0	0	0	0
No. 27 (Figure 4-8-7)			40631	100	100	0	0
			40631-P	183	0	0	183
			40628-UNT4	85	85	0	0
			40628-UNT6	106	0	0	106
			40628-UNT10	145	0	0	145
No. 28 (Figure 4-8-8)			40628-W	172	0	0	172
			40628-UNT9	242	0	12	230
			40628-UNT9a	128	0	0	128
No. 29 (Figure 4-8-9)			40628-EE	20	0	0	20
			40628-X	35	0	35	0
	F-73	0.007					
SUBTOTALS		**0.083**		**2,011**	**464**	**135**	**1,412**
GRAND TOTALS		**1.305**		**57,895**	**30,007**	**5,295**	**22,593**
JURISDICTIONAL TOTALS		**1.305**		**53,575**	**29,901**	**5,218**	**18,456**

*** 5,731 L.F. to be relocated to a 4,924 L.F. long channel including 171 L.F. of Box Culvert (No. 2 @ 99 L.F.; No.3 @ 72 L.F.)**

1. Proposing a slope pad and adjacent cut slope design that minimizes the lateral extent of the cut slope; and
2. Locating/designing associated mine facilities, e.g., roads, ponds, and other sediment controls, to avoid aquatic impacts where possible.

Measures taken to minimize stream and wetland impacts are further discussed in subsequent report sections.

Coal mined from the Pittsburgh seam will be transported to the surface through the slope entry via a belt conveyor. Equipment/supplies will be transported underground through the slope entry via rail cars on track. These operations require considerable flat surface areas, i.e., slope pad area.

The hoist house and drive tower needed for rail and conveyor operations, respectively, must be in alignment with but beyond the slope opening. For example, the hoist house needs to be far enough from the slope entry to allow cars pulled from the mine to be stacked clear of not only the slope opening, but also the track spur that will carry the cars to maintenance/supply areas. Track layouts on the pad must include sufficient space for the minimum required track turning radius.

A storage shop/maintenance building, office/locker room, and dry shed/ storage building are needed for storage, maintenance, and administration purposes and will be constructed just north of the slope entry. The area also will include space for employee parking and an electrical substation. The track network will be extended for travel from the slope to these areas.

The slope pad extends further north beyond these areas to provide the large equipment/supply storage yards needed to support the mining operations. This additional pad area will include a warehouse, and service/maintenance shops for the heavy equipment needed for the surface operations. It also will include ponds required for treatment of mine water and surface water runoff.

Hoge Run Road, which begins at S.R. 0018 and travels up the valley, is approximately 12 feet wide and is lacking adequate drainage and safety features required to facilitate proposed operations in a safe manner. The limited width of the existing road deems it substandard and unsafe for two way traffic. Thus, existing Hoge Run Road will be widened to 24 feet to accommodate two travel lanes through the proposed mine site and to include the proper drainage and safety features (i.e. guiderail) that will be provided. The proposed roadway upgrades are required for the increased vehicle/truck traffic that will occur as a result of mine development. Also, construction of the slope entry will require a widened pad area for coal removal from the mine. This widened slope pad area will require shifting approximately 480 linear feet of the adjacent section of Hoge Run Road.

Construction of the slope pad and associated facilities, including Hoge Run Road rehabilitation, will encroach on Hoge Run (Tributary 40632), and/or its unnamed tributaries and wetland areas as described in the following subsections.

The following subsections discuss in detail each impact resulting from construction of the slope entry facilities.

4.1.1 Impact Area No. 1: Hoge Run Stream (Tributary 40632) Relocation

Approximately 5,731 feet of Hoge Run will be relocated to the northern side of the valley to accommodate construction of the slope facilities and adjacent storage shed/supply yard area. Figure 4-1-1A and 4-1-1B shows the 25-foot wide corridor within which the relocated section of stream will be constructed. The relocated section of stream will meander within this corridor and will be approximately 4,924 linear feet long. The upstream end of the relocated channel will flow through a 14-foot wide by 9-foot high concrete box culvert 99 feet long (Box Culvert 3) to facilitate construction of the mine access road and accommodate heavy truck deliveries.

A second concrete box culvert (Box Culvert-2) having the same opening size will be constructed over Hoge Run at the approximate midpoint of the slope pad to facilitate a dedicated employee entrance for slope pad operations. The culvert will be 72 feet long. The purpose of this second entrance is to separate heavy truck traffic and employee vehicles entering the slope pad from a safety standpoint. Construction of Box Culvert 2 and the proposed stream relocation corridor also will impact Wetland F-52 (0.04 AC) and HOGE-2 (0.256 AC) as shown in Figure 4-1-1A.

Hoge Run relocation and construction of a “pad area” for the slope and supply yard area will impact streams discharging into Hoge Run. Due to Hoge Run shifting to the north, tributaries discharging to Hoge Run on the northern side will be shortened. Tributaries discharging to Hoge Run on the southern side will be filled. Further discussions of the impacts to these tributaries are presented under the remaining subsections.

4.1.2 Impact Area No. 2: Tributaries 40632-N, 40632-N2 & 40632-O

Approximately 34 linear feet of Tributary 40632-N (ephemeral) and 22 linear feet of Tributary 40632-N2 (ephemeral), will be impacted by construction of Diversion Channel DV-05 which will intercept flow in these tributaries. Construction of DV-05 will require excavation within these ephemeral channel sections. Refer to Figure 4-1-2. Channel DV-05 will collect surface runoff from undisturbed up-gradient areas, including flow from up-gradient sections of the two tributaries, and will divert the flow around the work area for discharge into Hoge Run.

Additional impacts to Tributaries 40632-N and 40632-O will result from construction of Sediment Pond #1, the pond access road, and required drainage features. Approximately 86 linear feet (perennial) of Tributary 40632-N will be filled. Flow from the remaining upstream section of channel 40632-N below Diversion Channel DV-05 will flow through a proposed culvert and into Sediment Pond #1. Impacts to Tributary 40632-O will consist of filling approximately 18 linear feet of intermittent channel and both excavation and filling within 57 linear feet of ephemeral channel as indicated on Sheet 1 of Figure 4-9. Flow from the remaining

upstream channel of 40632-O will be intercepted by Channel CC-16 and will pass through Sediment Trap #7 before being discharged into Hoge Run.

Impacts to these channels were minimized by ending the slope pad development on the northern side of Tributary 40632-N and constructing only the Sediment Pond #1 and Pond Access Road within this area. The sediment pond requires an access road for pond maintenance and clean-out. This access road will accommodate Collection Channel CC-16 and guiderail and maintains the minimum template width of 30 feet for safe access to the pond crest. The sediment pond was designed to the minimum capacity required to handle the contributing surface runoff from the adjacent slope pad. Additionally, the pond depth was increased to 13 feet to provide the design capacity required but allowing the ponds width to be reduced to a smaller footprint, thereby reducing the disturbance to the southern valley wall where the stream channels are located.

Due to the location of existing Hoge Run Road, the proposed Hoge Run stream relocation, and the existing valley being it's most narrow at this location, stream impacts along the southern valley wall could not be avoided.

4.1.3 Impact Area No. 3: Tributaries 40632-M, 40632-Q, and 40632-R

Tributaries 40632-M, 40632Q, and 40632-R discharge into Hoge Run from the northern side of the valley near the downstream end of the proposed slope pad area. Tributary 40632-M is a perennial stream whereas Tributaries 40362-Q and 40632-R are ephemeral steams that end at existing culverts on the northern side of Hoge Run Road. Flows from these two ephemeral streams between the existing culverts and Hoge Run disperse into sheet flow across the field; therefore, these segments of flow are not classified as stream channels. Sections of the three streams will be impacted by the proposed Hoge Run road upgrade work as well as slope pad construction, including the Hoge Run relocation. Refer to Figure 4-1-3 and Sheet 1 of the Figure 4-9 profiles.

Construction of the slope pad, Hoge Run Road upgrade, and the Hoge Run stream relocation will impact a total of 210 linear feet (perennial) of 40632-M, 171 linear feet (ephemeral) of 40632-Q, and 160 linear feet (ephemeral) of 40632-R.

A 164-foot long section of 40632-M downstream of an existing culvert carrying flow under Hoge Run Road, on the southern side of Hoge Run Road, will be eliminated as a result of the proposed work. Because of the Hoge Run stream relocation, these impacts could not be avoided. The impacts were minimized by keeping the pad width to a minimum and placing the relocated Hoge Run stream channel along the toe of the pad fill slope. Within this area, the slope pad width was reduced to the minimum needed to accommodate the slope hoist house and drive tower and still allow access (20-foot minimum) around the slope pad equipment for safe operation of the facility.

Road reconstruction (widening/re-alignment) in this area is needed to accommodate the widened slope pad area that must be developed for the hoist house and drive tower. It will require the existing culvert carrying 40632-M under Hoge Run Road to be replaced with a longer culvert

having a rock outlet apron at the outlet, and sump at the inlet end as shown on Figure 4-1-3. Discharge from the proposed culvert will be conveyed into the Hoge Run stream relocation. Roadway cut slope construction also will impact a small segment of channel north of the proposed sump to provide positive drainage from the undisturbed up-gradient portion of 40632-M and the proposed roadside collection channels into the proposed culvert. An additional 46 linear feet of Tributary 40632-M will be impacted on the northern side of Hoge Run Road. No alternatives to shifting the road are available due to the required Hoge Run Relocation, minimum required slope pad width, and minimum access around the Hoist House; therefore, the impact could not be avoided. Impacts to Tributary 40632-M in the vicinity of Hoge Run Road widening were minimized by avoiding placement of mine facilities (i.e., stockpiles, access roads, etc.) on the hillside bordering the road at the stream location and limiting the impact associated with culvert construction.

Approximately 90 linear feet of 40632-Q (ephemeral) and 160 linear feet of 40632-R (ephemeral) will be removed (i.e., excavated) as a result of the Hoge Run Road widening. The road widening is required for two way truck access to the Slope Pad and for installation of roadside drainage and safety guiderails. Existing culverts carrying 40632-Q and 40632-R under the existing Hoge Run Road will be removed. The up-gradient portion of Tributary 40632-R above the proposed cut slope will remain undisturbed and flow from this portion of stream will be collected in the proposed roadside channel and conveyed to the relocated Hoge Run stream through a new culvert. The proposed Hoge Run Road widening closely follows the alignment of the existing Hoge Run Road to minimize the disturbance and reduce the cut slope length to the north hillside. No other alternatives to widening or realign the road were available; therefore, the impacts could not be avoided.

Approximately 81 linear feet of the 171 total linear feet of impact to ephemeral Tributary 40632-Q above Hoge Run Road will be required for construction of the Topsoil Stockpile #10 Access Road and associated drainage features. The roadway embankment will be constructed within this channel section as indicated on Sheet 1 of Figure 4-9. The stockpile will be constructed as a side-hill fill and the location was chosen to avoid additional impacts within the adjacent stream valleys. Due to the existing steep hillside grades (35% to 40%), the access road to the stockpile area could not be established above the headwaters of tributary 40632-Q, thus this impact could not be avoided. The remaining up-gradient portion of Tributary 40632-Q will be collected in the proposed topsoil stockpile access road collection channel and conveyed to the Hoge Run stream relocation. The portion of 40632-Q between the topsoil stockpile access road and the Hoge Run Road cut slope will remain undisturbed. This drainage will flow to the proposed Hoge Run Road roadside collection channels and ultimately will be conveyed to the Hoge Run stream relocation as shown on Figure 4-1-3.

4.1.4 Impact Area No. 4: Tributaries 40632-EE & 40632-L and Wetlands A, B,C, F-55, & F-56

Slope pad construction between Sediment Pond #2 and the Pittsburgh slope entry will eliminate the following aquatic resources:

- Approximately 336 linear feet of the perennial Tributary 40632-L;
- Approximately 142 linear feet of ephemeral channel 40632-EE; and
- Wetland A (0.028 AC), B (0.001 AC) and C (0.106 AC). Total wetland impact is 0.135 acres.

Refer to Figure 4-1-4 and Sheet 1 of Figure 4-9.

Flow within the remaining upstream section of Tributary 40632-L not impacted by proposed activities will be intercepted by Channel CC-1-01 and conveyed to Sediment Pond #1.

The proposed aquatic impacts could not be avoided, due to the slope pad construction required in this area. The slope pad in this area is sized to support all operation activities required within close proximity of the slope entry located to the immediate east of this impact area. The proposed facilities to be constructed within this area are the slope pad access road, slope pad drainage features, railcar maintenance building, operations office and workers locker room, fueling station, overhead raw coal conveyer and all of the railcar tracks and loading spurs required to support the underground activities.

Impacts within this area were reduced by minimizing the slope pad width to only that required to accommodate the above noted facilities. Also, clearances around all surface equipment and structures were limited to that required for minimum access, operations and safety. To further minimize encroachment into Tributary 40632-L, cut slopes in rock were steepened.

4.1.5 Impact Area No. 5: Tributaries 40632-K and 40632-K12

Construction of Sediment Pond #2, the adjacent stream relocation, Hoge Run Road widening, and two facility access/haul roads will encroach on Tributary 40632-K and 40632-K12. Approximately 382 linear feet of perennial channel 40632-K and 189 linear feet of intermittent channel 40632-K12 will be impacted. Refer to Figure 4-1-5 and Sheet 2 of Figure 4-9.

Pond construction and the Hoge Run stream relocation will fill and/or excavate approximately 194 linear feet of Tributary 40632-K on the southern side of Hoge Run Road. The remaining impact to Tributary 40632-K on the northern side of Hoge Run Road will result from two culvert installations, including construction of two culvert outlet aprons. An existing culvert carrying Tributary 40632-K under Hoge Run Road will be replaced with a 75-foot long culvert to facilitate the widening of Hoge Run Road. Additional cut will be required at the inlet of this roadway culvert to construct a sump to provide positive drainage into the new culvert from the roadside collection channels and the remaining up-gradient portion of Tributary 40632-K. A rock outlet apron will be constructed at the discharge end of the roadway culvert within the Hoge Run Stream relocation corridor.

A new culvert will also be installed further upstream to carry the Tributary 40632-K under the access roads to Sediment Trap #15 and Stockpiles #3 and #9. Construction of the stockpile area

access road and up-gradient Sediment Trap #14 also will eliminate the entire length of the intermittent Tributary 40632-K12.

Relocation of the existing Hoge Run stream results in a portion of the remaining Tributary 40632-K to be abandoned (on the southern side of the relocated Hoge Run corridor). Additionally, construction of Sediment Pond #2 and the Slope Pad fills will encroach on the lower reaches of 40632-K. Therefore, this impact could not be avoided. The Hoge Run Road culvert impact could not be avoided due to the widening of Hoge Run Road and the longer culvert required to the up-gradient drainage. Finally, the access road from Hoge Run Road to the sediment traps/stockpiles could not be located in a manner that avoids crossing either Tributary 40632-K or 40632-K12. The length of road needed to traverse the elevation differential (Hoge Run Road to the stockpiles) at a reasonable roadway grade for safe access to the stockpile area prevents a driveway entrance from being located between Tributary 40632-K (to the north) and Tributary 40632-M (to the south). As a result, the stream crossing and associated culvert could not be avoided.

The impacted length of stream was minimized by limiting impacts above Hoge Run Road to primarily access road crossings only, and by providing efficient roadway designs that minimize the lateral extent of impact to the stream channel. That is, the access roads were designed to have a combination of roadway alignment, roadway grade, and slope grade that would keep the length of the impact to a minimum. The stockpiles were designed and located to have no additional impacts upstream of the roadway culvert crossing. Construction of the Sediment Trap #14 embankment toe area will fill Tributary 40632-K12 which cannot be avoided. Steepening the embankment slope to avoid the tributary will compromise embankment stability.

4.1.6 Impact Area No. 6: Raw Coal Pad and Associated Access Roads

4.1.6.1 Raw Coal Pad: Tributaries 40632-J, 40632-J10, 40632-J11, 40632-J12, 40632-J13, and 40632-J14

Tributary 40632-J and its sub-tributaries will be completely eliminated by construction of the proposed Foundation Mine surface facilities. Approximately 1,528 linear feet of perennial and 247 linear feet of ephemeral channel 40632-J will be filled to create a pad for the raw coal stockpile area and for slope pad construction as shown on Figure 4-1-6. Slope pad construction will fill the lower section of this stream channel, but the remainder of Tributary 40632-J, the majority of the channel, will be eliminated by construction of the raw coal stockpile area. Additionally the following sub-tributaries will be eliminated:

- 282 linear feet of the perennial stream 40632-J10.
- 367 linear feet of Tributary 40632-J11; 273 feet of perennial and 94 feet of ephemeral channel.
- 89 linear feet of the ephemeral stream 40632-J12.
- 169 linear feet of the ephemeral stream 40632-J13.
- 65 linear feet of the ephemeral stream 40632-J14.

Raw coal processing (cleaning) rates often vary from mine production rates. A raw coal storage area is needed as an interface between the two operations; that is, to allow underground mine operations to continue uninterrupted when problems occur at the preparation plant and coal processing rates must be temporarily reduced or stopped. Raw coal produced by a longwall mining operation generally is stored in a stockpile rather than a silo due to the relatively high mine production rates and large quantity of coal that will need to be stored at any one time.

Development of a stockpile area within a valley allows greater storage per acre than a stockpile on a flat surface such as a hill top. At a valley site the coal can be stockpiled against the valley walls eliminating the continuous out-slopes that otherwise would be required. Also, the valley site compared to a hill top site is better with respect to the stability of the stockpile, visibility and dust control. However, development within a valley results in stream impacts that may not be associated with a hilltop site.

Design of Foundation Mine's raw coal stockpile area considered development of a site located at the top of the hill (above the proposed site) to avoid stream impacts, but the resulting design was not practical. The ridge top is the only area between the slope entry and preparation plant that could be developed to provide sufficient stockpile area without impacting a stream. But, the ridge is narrow relative to the area required for storage; therefore, grading to create the pad area and avoid stream impacts would need to be almost entirely in cut. Any significant amount of fill placed to create flat pad area would result in an embankment slope extending into adjacent valleys and streams. To avoid fill placement, up to 143.5 feet of cut would be required to construct the alternate raw coal pad area which would result in a pad approximately 101 feet higher than the proposed pad area. This extreme cut would generate approximately 2.3 million cubic yards of material that would have to be stockpiled - further increasing aquatic impacts in the Hoge Run valley. Additionally, approximately 5,060 feet of new conveyor, with four transfer stations, would need to be perched on the hillside to convey the coal up to a hill top stockpile area and not exceed the maximum conveyor lift of 15 degrees. Because of the excessive cut and additional conveyor length and associated site disturbance, this alternative was considered not practical and eliminated from further consideration. Therefore, it was determined that implementation of a "no impact" alternative was not feasible but that all of the impacts could be contained within this one valley.

As an attempt to minimize impacts to Tributary 40632-J and its sub-tributaries, a northwest/southeast oriented pad area was considered. However, to provide the required stockpile area, the resulting layout encroached on streams within the Tributary 40632-I valley as well as 40632-J and actually impacted more stream length than the proposed layout represented in Figure 4-1-2. Development of the proposed site would result in the least aquatic impact.

4.1.6.2 Raw Coal Access Road: Tributaries 40632-L1, 40632-L1a, 40632-L1a1, and 40632-L1b

The Raw Coal storage area requires heavy equipment access to and from the Slope Pad and the Preparation Plant Pad. Construction of the roadway section between the coal storage area and preparation plant will require placement of fill within the Tributary 40632-L watershed.

Additionally, collection channel CC-2-01 will be required to control and convey runoff from the proposed fill embankment to Sediment Pond #2. The following ephemeral channels will be impacted by channel construction as noted below and as shown on Figure 4-1-6.

- 20 linear feet of ephemeral stream 40632-L1 will be excavated.
- 17 linear feet of ephemeral stream 40632-L1a will be excavated.
- 159 linear feet of ephemeral stream 40632-L1a1 will be impacted by excavation and filling activities as noted on Sheet 2 of Figure 4-9.

To minimize stream impacts, the proposed access road alignment was moved to the highest point possible within the Tributary 40632-L watershed considering the proposed adjacent development and acceptable roadway grades. The access roadway widths were reduced to the minimum acceptable width of 60 feet to accommodate the roadside collection channel, earthen berms for safety, and to accommodate heavy equipment access to and from the preparation plant. Impacts in this area were kept to a minimum and only the upper reaches of the Tributary 40632-L watershed will recognize impacts in this area.

4.1.7 Impact Area No. 7: Tributary 40632-FF

The entire length of ephemeral channel 40632-FF, approximately 264 linear feet, will be eliminated by construction of the slope pad, adjacent Hoge Run stream relocation and the proposed Hoge Run Road widening which could not be avoided. Refer to Figure 4-1-7 and Sheet 2 of Figure 4-9. The existing 15-inch corrugated metal pipe (CMP) culvert that carries Tributary 40632-FF under the existing Hoge Run Road will be removed due to the road widening construction. This existing culvert no longer will be required since the flows directed to it (approximately 50 linear feet of Channel 40632-FF upstream of the existing roadway) will be eliminated due to the new cut slope required for the Hoge Run Road upgrades. A new roadside channel, CC-HR13, will intercept the hillside drainage and convey it through a proposed culvert to the new Hoge Run stream relocation.

4.1.8 Impact Area No. 8: Tributary 40633 and Wetland Hoge-1

Tributary 40633 is a perennial stream that discharges into Hoge Run on the north side of the valley. This stream will be impacted by the Hoge Run stream relocation and slope pad construction as well as by the Hoge Run Road upgrade. Refer to Figure 4-1-8 and Sheet 2 of Figure 4-9.

Approximately 199 linear feet of 40633 will be removed as a result of excavation and embankment construction activities in this area as shown on Sheet 2 of Figure 4-9. Fill for the slope pad will extend over the downstream section of channel that will be abandoned. This impact could not be avoided, because of the Hoge Run stream relocation. The impact was minimized by reducing the slope pad width as needed to facilitate construction of the pad and adjacent stream relocation with minimal disturbance of the northern Hoge Run valley wall.

Road reconstruction and widening will require an existing 28-inch CMP culvert carrying Tributary 40633 under Hoge Run Road to be replaced with a longer culvert having a rock outlet apron, and sump at the inlet end – all of which will impact the stream channel as shown on Figure 4-1-8. To maintain stream flow under the road, the culvert has to be extended and the stream impact cannot be avoided. Impacts to Tributary 40633 in the vicinity of Hoge Run Road were minimized by avoiding placement of mine facilities (i.e., stockpiles, access roads, etc.) on the hillside bordering the road at the stream location and limiting the impact to that associated with culvert construction and roadway widening. The remaining portion of Tributary 40633 up-gradient of the roadway reconstruction will remain undisturbed and will be conveyed through the proposed culvert to relocated Hoge Run.

Slope pad construction will eliminate one wetland, Hoge-1. This wetland is located a few hundred feet upstream of Tributary 40633. Hoge-1 covers an area of approximately 0.128 acre and will be removed in its entirety. Construction of a slope pad area having sufficient width for the mine facilities plus an adjacent relocated stream channel necessitated encroachment on this wetland as shown on Figure 4-1-8.

4.1.9 Impact Area No. 9 - Sediment Pond #3: Tributaries 40632-BB, 40632-CC, 40632-DD, 40632-I, & 40632-I1 and Wetlands F-44 & F-45

Construction of the upper end of the slope pad, Sediment Pond #3, and adjacent Raw Coal pad access road will encroach on five ephemeral, intermittent and perennial tributaries as indicated on Figure 4-1-9 and as itemized below:

- 40632-BB: 158 linear feet of ephemeral and 80 linear feet of intermittent channel.
- 40632-CC: 191 linear feet of ephemeral channel.
- 40632-DD: 278 linear feet of ephemeral and 39 linear feet of intermittent channel.
- 40632-I: 517 linear feet of perennial channel.
- 40632-I1: 26 linear feet of ephemeral channel.

Construction of Sediment Pond #3 also will fill a total wetland acreage of 0.029 acre as shown in Figure 4-1-9. Wetland impacts are as follows:

- Wetland F-44, 0.004 acre impacted.
- Wetland F-45, 0.024 acre impacted.

Up-gradient sections of Channels 40632-BB, 40632-DD and 40632-I will be excavated during sediment pond construction. The lower portions of these three channels will be filled during construction of the sediment pond embankment, slope pad, and raw coal pad access road. Channels 40632-CC and a small section of channel 40632-I1 will be excavated by construction of the sediment pond and required cut slopes on the southern side of the pond.

Remaining up-gradient sections of Tributaries 40632-I and 40632-I1 that will not be disturbed by proposed activities will discharge into Sediment Pond #3. The lower (undisturbed) section of

Tributary 40632-BB on the northern side of Sediment Pond #3 will continue to flow into Hoge Run.

Wetlands F-44 and F-45 will be completely filled due to Sediment Pond construction.

Sediment Pond #3 is needed to control sedimentation from construction areas within its immediate watershed and other areas above the slope pad. Moving this pond to a higher elevation to avoid aquatic impacts would make it inaccessible by collection channels used to control runoff from much of the disturbed area. For this reason, use of a higher alternate location for Sediment Pond #3 was eliminated from further consideration and the proposed location was selected for its development.

Attempts were made during pond layout to limit impacts to the existing tributaries and to avoid impacts to channels 40632-I and 40632–I1. Options reducing the overall pond length and ending pond construction prior to impacting Tributaries 40632-I, 40632-I1 and 40632-DD were considered. The reduced pond length required an extremely wide pond to maintain the required storage capacity and resulted in an extremely large hillside cut which substantially increased site disturbance. Also, the resulting pond length to width ratio (4:1) would not satisfy agency requirements for proper sediment control. Extending pond construction in the northern direction resulted in total elimination of the intermittent and ephemeral portions of Tributary 40632-AA and further impacted the existing Hoge Run stream channel (Tributary 40632). As a result, this alternative was abandoned. The current Pond #3 configuration represented in Figure 4-1-9 reflects a steepened cut slope design on the southern side of the pond to reduce encroachment on up-gradient segments of existing streams. Cut slopes through competent rock will be steepened from 2:1 to 1:1. The upper reaches of the stream 40632-I and its contributing tributaries will remain undisturbed.

Construction of the Raw Coal Access Road will impact any remaining downstream section of Tributary 40632-I as well as Tributary 40632-DD. Re-alignment to avoid these tributaries is not possible because the roadway bend needed to avoid the slope pad warehouse and streams would result in a radius not negotiable by tractor trailers that will bring supplies to the mine and heavy equipment requiring access to the slope and raw coal pads during day to day mining operations. Additionally, the elevation differential between the Slope Pad and Raw Coal Pad set the length of the access road. Maximum roadway grades and minimum roadway widths acceptable for safe operations were implemented to reduce further impacts.

4.1.10 Impact Area No. 10 - Sediment Pond #6: Tributary 40632 (Hoge Run) and Tributary 40632-AAA

Sediment Pond #6 is required for sedimentation and drainage control for up-gradient construction of the refuse haul road embankment, refuse maintenance pad and stockpile areas. Construction of Sediment Pond #6 will impact ephemeral, intermittent and perennial portions of Tributaries 40632 (Hoge Run) and 40632-AAA as shown in Figure 4-1-10 and as discussed below.

A 14-foot wide by 6-foot high concrete box culvert will be constructed to carry the Sediment Pond #6 access road over Hoge Run as shown on Figure 4-1-10. The culvert will be 65 feet long and will impact approximately 108 linear feet of Hoge Run (perennial). Refer to Sheet 3 of Figure 4-9. Additionally, excavation and embankment construction for Sediment Pond #6 will impact 25 linear feet of intermittent and 81 linear feet of ephemeral portions of Tributary 40632-AAA as indicated by the drawings. The lower (undisturbed) portion of Tributary 40632-AAA will continue to flow into the existing Hoge Run stream channel.

Access to the pond is required for cleanout, maintenance and inspection and could not be achieved practically without crossing a stream due to the pond's location along the southern valley wall which parallels the existing Hoge Run Stream (40632). The magnitude of the impact was minimized by providing an efficient roadway design that minimizes the lateral extent of fill within the stream channel. The height of fill over the stream was controlled by (and limited to) the culvert size needed to pass the required design storm event (10-year, 24-hour storm event) and by the road grade needed to access the pond.

The location of Sediment Pond #6 was selected due to the limited number of tributaries along the southern valley wall adjacent to the existing Hoge Run stream channel within this area. Due to the up-gradient construction and drainage conveyance requirements, the pond needed to be located at a lower elevation within the Hoge Run valley. Locating the pond at a higher elevation would make it inaccessible by the collection channels used to control runoff from the disturbed areas. To minimize disturbance to the Hoge Run stream channel (40632), the pond was configured to maximize its length to width ratio, thus creating a long, narrow sediment pond. The pond then was located deep in the southern valley wall and the cut slopes were steepened to 1:1 within all competent rock areas. Because of the depth of cut required for pond construction and the required pond embankment, a portion of Tributary 40632-AAA could not be avoided. Impacts to the existing Hoge Run stream channel (perennial Tributary 40632) were limited only to fill from a pond access road facilitated by the concrete box culvert.

As indicated above, Sediment Pond #6 has been designed to avoid encroachment within the Hoge Run stream channel. However, the adjoining section of Hoge Run will be impacted during site preparation for Coal Refuse Disposal Area R-3when Sediment Pond #6 is expanded and reconfigured to create a sediment/treatment pond for the R-3 disposal area. Refer to Section 4.7.2 of this document for a discussion of Hoge Run impacts that will result from development of the coal refuse disposal facility.

4.2 REFUSE HAUL ROAD AND EQUIPMENT MAINTENANCE FACILITY FOR COAL REFUSE DISPOSAL AREA NO. R-3

Impact Area No. 11: Tributaries 40632-GG, 40632-H, 40632-H1, 40632-H1a, 40632-H2, 40632-H5
Wetlands F-21, F-21 and F-28

Operation of the coal refuse disposal facility will require that access be provided to the top of the facility as well as its lower levels. As a result, the access road passing through the plant area on

top of the hill will be extended to Disposal Area R-3 and used as a haul road. Near the disposal area, the roadway "bench area" will be widened to accommodate construction of an equipment maintenance facility. Refer to Figure 4-2. This facility is needed for storing, refueling, and maintaining earthmoving equipment that will be used to operate the disposal facility and it must be located in the vicinity of the disposal area.

Embankment construction for the equipment maintenance facility and adjoining haul road will encroach on approximately 695 linear feet of ephemeral stream channel and 104 linear feet of intermittent channel within the Tributary 40632-H watershed as indicated on Figure 4-2 and Sheet 3 of Figure 4-9. Itemized stream impacts are as follows:

- 40632-GG: 92 linear feet of ephemeral channel.
- 40632-H: 342 linear feet of ephemeral channel.
- 40632-H1: 104 linear feet of intermittent channel and 108 linear feet of ephemeral channel.
- 40632-H1a: 54 linear feet of ephemeral channel.
- 40632-H2: 33 linear feet of ephemeral channel.
- 40632-H5: 66 linear feet of ephemeral channel.

Additionally a total of 0.073 acre of wetlands will be impacted by embankment construction and development of this area as shown in Figure 4-2. Itemized wetland impacts are as follows:

- Wetland F-21 (0.052 acre)
- Wetland F-22 (0.012 acre)
- Wetland F-28 (0.009 acre)

These three wetlands will be completely removed by proposed site grading.

These itemized tributaries and Wetland F-28 will be filled or excavated to establish the site grades needed to construct the embankment required for this facility. Wetlands F-21 and F-22 will be filled due the placement of Topsoil Stockpile #11.

Alternate facility layouts were explored to try and develop a design that avoided stream impacts. However, given the site's location at the top of a relatively narrow ridge, stream impacts could not be avoided. Widening the fill toward the west or south would result in fill slopes encroaching on tributaries within the Tributary 40638 and 40638-E stream valleys and into an exceptional value watershed. Placement and stockpiling of stripped topsoil needs to be within close proximity of the construction area to avoid additional haul road construction and further site disturbance. This topsoil will be used during reclamation operations when the mine is closed and the surface facilities are de-constructed and the site returned to its original grades. To avoid additional stream impacts in the low portions of the Hoge Run valley, the Topsoil Stockpile #11 needed to be constructed as a side hill fill embankment and the drainage control for this stockpile needed to be conveyed into Sediment Pond #6 to avoid the construction of additional sediment traps or ponds. Due to the volume of topsoil requiring storage and the 2:1 out-slopes required for stability of the side hill fill, locations up-gradient of Sediment Pond #6 were limited in this

area without realizing further stream impacts. Consequently, impacts were limited to the two small wetlands F-21 and F-22 (0.064 acres total) and could not be avoided.

The proposed alternative was selected for development to keep stream and wetland encroachments within the Hoge Run watershed thus eliminating aquatic impacts to the adjacent watersheds. The proposed development area was configured so that all impacts were limited to the upper reaches of the streams and wetlands. This location preserves the down-gradient portions of these tributaries and Hoge Run (40632) itself. Stream impacts associated with the proposed site layout were minimized by developing an embankment layout presenting the smallest fill slope length possible while maintaining the earthwork balance and required roadway grade limits. That is, the pad area width was kept to a minimum, the pad was shifted to the west and to the top of the ridge as much as possible without impacting neighboring streams, and pad elevations were adjusted downward where practical.

4.3 CLEAN COAL STOCKPILE AREA / TRIBUTARY 40635-L WATERSHED

Impact Area No. 12: Tributary 40635-L, Contributing Tributaries and Wetland E

During site grading, the majority of Tributary 40635-L and its unnamed tributaries located north of S.R. 3020 will be filled with embankment material to: 1) produce a pad area for stockpiling clean coal, 2) construct a pond for control of site runoff and sedimentation (Sediment Pond #4), and 3) construct an access road from S.R. 3020 to each of these facilities. Wetland E adjacent to the stream also will be filled as part of proposed site grading.

South of S.R. 3020, Tributary 40635-L will be impacted by construction of a culvert that will carry the stream under a driveway proposed within the supply yard and parking areas servicing the Pittsburgh seam mine shaft. The driveway will provide access from the shaft pad without forcing vehicle and pedestrian traffic onto S. R. 3020.

A site plan showing these encroachments (Impact Area 12) is presented as Figure 4-3-1 and Figure 4-3-2. More detailed discussion of the two encroachment subareas follows.

4.3.1 Encroachment North of S.R. 3020 – Figure 4-3-1

Clean coal produced by the Foundation Mine will be temporarily stockpiled before being loaded into rail cars and transported off-site. Because off-site transport rates are not consistently the same as clean coal production rates, a temporary clean coal storage area is needed to ensure uninterrupted operation of the preparation plant. For example, when coal load-out operations are down, the plant can continue to operate and produce clean coal.

The required clean coal pad size (approximately 12 acres in a valley site) must provide sufficient area for coal stockpiling plus contingency overflow area (push area). Given the relatively large amount of clean coal storage capacity that must be provided (approximately 180,000 tons), storage in silos is not practical. A typical clean coal silo can store 15,000 tons of coal so a

similar size pad area would be required for the 12 silos and network of transfer and feeder conveyors that would be required for a silo storage operation.

Proposed construction for the pad includes a pond for sediment control (Sediment Pond #4) and development of a site access road. The road from S.R. 3020 to the clean coal storage will continue up the hill to the preparation plant. Access to the plant from S.R. 3020 is needed as a safety measure to prevent preparation plant traffic (mine personnel and delivery vehicles) from having to access the plant from the slope pad and travel a circuitous route through the mine operations.

The proposed facility design provides for construction of the clean coal stockpile facilities within the valley containing Tributary 40635-L, a tributary to House Run. As a result, construction for the pad, site access road, and Sediment Pond #4 will encroach on the section of Tributary 40635-L located north of S.R. 3020, including contributory streams – approximately 3,121 linear feet of perennial stream channel, 589 linear feet of intermittent stream channel and 735 linear feet of ephemeral channel as noted on Table 4-1. One small wetland area, Wetland E (0.037 acre), also will be filled by proposed construction. Figure 4-3-1 shows locations of the proposed clean coal storage area facilities relative to the impacted Tributaries and Wetland. Stream profiles showing proposed construction are presented on Sheet 4 of Figure 4-9.

Encroachment within Tributary 40635-L and the adjacent wetland area could not be avoided and the proposed layout could not be revised to further minimize aquatic impacts. No other site near both the preparation plant and batch weigh load out facility provides the acreage needed for stockpile development. The hilltop bordering Tributary 40635-L to the west is a relatively narrow ridge that would require considerable cutting and filling to provide the size area needed for stockpile development – especially since the site would not offer the stockpile containment associated with a valley site. Fill slopes resulting from a balanced earthwork layout would extend into both bordering valleys/streams, impacting streams within a second watershed. Also, the sediment pond would need to remain at its proposed location within the valley since it needs to be at a lower elevation than the stockpile.

4.3.2 Encroachment South of S.R. 3020 – Figure 4-3-2

As indicated on Figure 4-3-2, the Tributary 40635-L encroachment also includes a relatively short channel section south of S.R. 3020 that will need to be conveyed through a new culvert under a proposed access road within the supply yard/parking area. This driveway is needed to access the western end of the supply yard. Without the access road, equipment retrieving supplies stored at the western end of the yard would need to use S.R. 3020 for access via an additional driveway. This alternative would present a safety hazard considering the 40 mph speed limit on the state road.

An existing culvert (39 feet long) at the proposed driveway location carries an existing driveway over Tributary 40635-L; therefore, the proposed site upgrade will replace these facilities. The stream encroachment length was minimized by rehabilitating the existing driveway over the tributary as shown in Figure 4-3-2 and Sheet 4 of Figure 4-9. The proposed culvert will be 61

feet long and will replace the existing 39-foot long culvert. The additional proposed culvert length will account for 22 linear feet of impact after the existing culvert is removed. Rock aprons will be located at the entrance and existing points of the proposed culvert to control erosion. The impact length for the two aprons will be 43 linear feet resulting in a total impact length of 65 linear feet.

The proposed stream impact was minimized by separating the eastern and western portions of the supply yard. Constructing a continuous pad rather than the proposed design presenting a pad separation and driveway connection would result in an impacted stream length of 201 linear feet.

4.4 SHAFT FACILITIES AND ADJACENT SUPPLY YARD

Personnel entry to mine workings in the Pittsburgh seam will be through a shaft located near the confluence of House Run and Garner Run with McCourtney Run. A relatively large pad area will be constructed to accommodate the shaft and fan structure, the bath house and required parking facilities as shown on Figure 4-4-1. The pad will be extended to the west along House Run to provide yard lay-down area for mine supplies. Topsoil and any excess soil excavated from the site during construction will be placed in Topsoil Stockpile #8 or Soil Stockpile #1, respectively at the locations noted on Figure 4-4-2. Therefore, these stockpiles and associated drainage facilities and roads are considered part of the shaft facility.

Construction of the Pittsburgh shaft facilities will require the following two stream encroachments and one wetland encroachment:

- House Run (Tributary 40635): 92 linear feet of perennial channel.
- Tributary 40645-Q: 204 linear feet of ephemeral channel.
- Wetland F-4: 0.023 acre (to be filled)

4.4.1 Impact Area No. 13: Pittsburgh Shaft Pad and Supply Yard; Tributary 40635 (House Run) and Wetland F-4

The Pittsburgh Shaft Pad/Supply Yard layout has been designed to minimize stream encroachments. Typically the shaft area and supply yard share one pad which is the preferred layout for availability of space and accessibility. At the proposed project site, House Run flows through the area so development of one pad area would require enclosing House Run in a 250-foot long stream enclosure. To minimize this impact, the shaft pad area and supply yard have been laid out as two separate pads connected only by an access road/driveway.

Encroachment on House Run has been limited to one 16 ft by 6.5 ft concrete box culvert approximately 54 feet long plus an additional 38 feet for installation of the Water Supply Pipeline discussed under Section 4.6.3, Impact area No. 19. The concrete box culvert was sized to pass the required design storm of a 10-year, 24-hour storm event and the adjacent pad elevations were designed to prevent a 100-year storm event from flooding onto the shaft pad and potentially entering the shaft opening and inundating the mine. The total length of stream

impact will be 92 feet. The height of fill over the culvert was kept to a minimum which in turn minimized the required culvert length. Water supply pipeline installation, which will be concurrent with culvert installation, will eliminate any additional impacts that would have been necessary due to pipeline construction. Access to the supply yard from the shaft pad is imperative for mine operations; therefore construction of this culvert could not be avoided. Without the access road, equipment retrieving supplies stored in the yard area would need to use S.R. 3020 and S.R. 18 for access. This alternative would present a safety hazard considering the 40 mph speed limit on the state roads.

Wetland F-4, 0.023 acres, respectively, will be filled to develop the supply yard area adjoining the shaft pad as shown in Figure 4-4-1. To develop sufficient operating room in close proximity to the shaft pad, this wetland impact could not be avoided. The pad to be graded for use as the supply yard was kept north of House Run to avoid any additional stream impacts.

4.4.2 Impact Area No. 14: Shaft Pad Stockpile Areas; Tributary 40645-Q

An excess soil stockpile and a topsoil stockpile west of the shaft pad area will be accessed during site construction and reclamation via an access road from the shaft pad. Construction of the road will require crossing an ephemeral section of Tributary 40645-Q. Approximately 204 linear feet of the ephemeral channel section will be filled and/or removed by grading to form the access road and by construction of Diversion Channel DV-01A and Collection Channel CC-37. Refer to Figure 4-4-2 for locations of the road relative to the channel. Flow from the remaining up-gradient section of ephemeral channel that will not be disturbed will be intercepted by Channel DV-01A for discharge into House Run.

Tributary 40645-Q extends up the northern valley wall a considerable distance relative to the other unnamed tributaries entering 40645 on the north. Encroachment on this tributary by roadway construction cannot be avoided. Shifting the horizontal alignment of the road up the hill to avoid this tributary would result in a roadway vertical grade of 18.5% which is too steep for loaded haul trucks to safely ascend and descend during construction. To minimize the impact, the maximum roadway grade was increased from a desired maximum of 10.0% to 14.3% for the initial 600 feet of roadway to facilitate crossing the tributary within the ephemeral reach rather than the intermittent or perennial channel sections.

4.5 BATCH WEIGH FACILITY

Transporting clean coal offsite by rail will require construction of a rail spur dedicated to the Foundation Mine operations for loading the rail cars. Loading will be accomplished using a Batch Weigh Loadout structure. The loadout structure will be located over the proposed rail spur and will be continuously supplied with clean coal via conveyor belt from the Clean Coal Pad stockpile area during loadout operations. The Batch Weigh Loadout is compromised of a vertical surge bin hopper with the capacity to store approximately 400 tons of clean coal and also houses a weight bin to meter and weigh the coal being processed. This Loadout hopper will

facilitate the rapid loading of coal into the rail cars and can provide a loadout rate up to approximately 6,500 – 7,000 tons per hour.

4.5.1 Impact Area No. 15: Tributaries 40644 and 40644-A

As part of the earthwork needed to construct the additional track, a widened fill will need to be placed in the valley containing Tributary 40644, a tributary to Garner Run. An existing 72-inch corrugated metal pipe (CMP) culvert carrying Tributary 40644 under the existing track will need to be extended to the east approximately 81 feet to carry the stream under the new embankment. This culvert extension will impact 102 linear feet of the perennial channel identified as Tributary 40644. Refer to Figure 4-5-1 and Sheet 3 of Figure 4-9. The exiting culvert also will be extended approximately 94 feet to the west to carry Tributary 40644 under an embankment that will need to be constructed to provide access to the rail line and adjacent batch weigh facility. The western culvert extension will impact 96 linear feet of the perennial channel section. The total length of the Tributary 40644 impact for the two culvert extensions is 198 linear feet. This total length includes construction of two collection channels at the inlet side of the culvert.

The widened pad area for the Batch Weigh Loadout and rail spurs also will impact 426 linear feet of intermittent channel identified as Tributary 40644-A. This tributary primarily collects the existing track side drainage and conveys the flow to an existing 72-inch CMP culvert. Extensions to this existing culvert are proposed. Due to the widening required for this facility and the culvert extension, this impact could not be avoided.

As discussed under Section 4.8 of this document, construction of the rail spur along the east side of the existing tracks and required widened fill could not be avoided. Fill placement over an additional downstream section of the perennial Tributary 40644 and culvert extension to the west also is required to facilitate access between the northern and southern sides of the Batch Weigh pad required for operations. This pad access over the proposed culvert extension to the west was kept to the minimum (30-foot) required for safe operation of the Batch Weigh Loadout. Consequently, extension of the existing culvert as proposed and the associated stream encroachments could not be avoided.

Stream encroachments were minimized, however, by providing an efficient design that minimizes the lateral extent of fill within the stream channel. That is, the width of the batch weigh "pad" area in the vicinity of the tributary was limited to the 30 feet needed for truck access to the area. Fill slopes have been designed with 2:1 slope ratios to further reduce the length of the impacts.

4.5.2 Impact Area No. 16: Tributary 40628-I Watershed & Wetland G

Grading for construction of the batch weigh facility (including the adjacent rail spurs), the batch weigh pad access road, and the access road to Sediment Pond BW-1 will eliminate Wetland G, 0.012 acres, and sections of perennial Tributary 40682-I and ephemeral Tributary 40628-I2 as well as ephemeral Tributary 40628-I2a. Figure 4-5-2 shows the stream segments that will be

impacted; Sheet 3 of Figure 4-9 presents profiles of the stream segments to be affected. Tributary 40628-I conveys up-gradient drainage under the existing Norfolk Southern railroad track through an existing 24-inch CMP culvert. Widening to the east for the proposed rail spurs will require this culvert be abandoned in place and will impact 101 linear feet of perennial Tributary 40628-I. Construction of fill embankment to the west will impact an additional 311 linear feet of this perennial tributary.

The cut slope on the eastern side of the proposed track widening project will remove a portion of ephemeral Tributary 40628-I2 (153 linear feet) and ephemeral Tributary 40628-I2a will be removed in its entirety. The sections of Tributaries 40628-I and 40628-I2 located up-gradient of the proposed project site will remain undisturbed and will discharge to the proposed Collection Channel CC-RR15 (which parallels the proposed track sidings) and ultimately be conveyed to McCourtney Run through a proposed culvert located to the north.

Additionally, the ephemeral portions of Tributaries 40628-I and 40628-I2 will be impacted by Diversion Channel DV-RR02 near the head waters of these streams. Channel DV-RR02 will cross the two ephemeral stream channels and convey flow to Tributary 40644. The Diversion Channel DV-RR02 is required to reduce the large amount of up-gradient drainage that would, otherwise, flow across the construction site.

Itemized stream impacts with this area are as follows:

- 40628-I: 412 linear feet of perennial and 26 linear feet of ephemeral channel.
- 40628-I2: 153 linear feet of ephemeral channel.
- 40628-I2a: 54 linear feet of ephemeral channel.

Avoidance of Tributary 40628-I and the Wetland G encroachment, and minimization of impacts by construction for the batch weigh pad and adjacent rail spur is not possible for the reasons presented in the previous section regarding Tributary 40644 impacts. The stream encroachment length at this location is greater than the Tributary 40644 encroachment because at this location the fill slope from the batch weigh pad area includes two access roads which also cross Tributary 40628-I. Because of the elevation differential between the existing access road culvert over Garner Run and the batch weigh pad, insufficient distance is available between Tributaries 40628-I and 40644 for construction of an access road that avoids a tributary crossing and maintains an acceptable roadway grade. Construction of an access road that would traverse the elevation differential within this area would result in roadway in excess of 15.0% which is not practical for safe passage by truck and vehicular traffic.

4.6 WATER SUPPLY SYSTEM

Water needed for coal mining and processing will be obtained from a fresh water impoundment to be constructed within a valley south of Holbrook along the west side of S.R. 18, in an area identified on the USGS topographic map as Woodruff. The location of the impoundment relative to other proposed mine facilities is shown on the Figure 4-1 project overview map. Plan

drawings showing aquatic impacts resulting from construction of the impoundment and related facilities are presented as Figures 4-6-1A and 4-6-1B.

Runoff collected by the impoundment will be supplemented with water withdrawn from South Fork Ten-Mile Creek. A water intake structure will be constructed adjacent to and within South Fork Ten Mile Creek just downstream of its confluence with Hargus Creek at the approximate location shown on Figure 4-6-2. Water withdrawn from the creek will be conveyed by pipeline along S.R. 18 to the impoundment. The process water line between the impoundment and the preparation plant also will follow S.R. 18 before turning west/northwest into the shaft pad area where it will continue across House Run and S.R. 3020 and up to the plant.

4.6.1 Impact Area No. 17: Water Supply Impoundment

Coal cleaning operations and underground mining equipment operation will require water at an estimated rate of approximately 1700 gallons per minute. To support proposed underground and surface mining operations, an impoundment having a water storage capacity of at least 600 million gallons, and preferably 650 million gallons, will be needed to provide sufficient water during drought periods.

The proposed Woodruff site will facilitate development of an impoundment having this required storage capacity, but will require encroachment within the Tributary 40649 watershed (unnamed tributary to Garner Run) as shown on Figure 4-6-1A and Figure 4-6-1B. It will impact the majority of the unnamed tributaries within that watershed and one small Wetland 40649-W1 (0.010 acre). Impoundment construction also will require a temporary pond for sediment control. As indicated on Figure 4-6-1A, Sediment Pond W1 will encroach on an additional segment of Tributary 40649 adjacent to S.R. 0018. Additionally, four Tributaries to 40645 watershed (Figure 4-6-1B) will be impacted by access road construction on the northern side of the proposed impoundment. The total impacted stream lengths shown on Figure 4-6-1A and Figure 4-6-1B by classification type are as follows:

- Perennial: 4,813 linear feet
- Intermittent: 1,582 linear feet
- Ephemeral: 5,581 linear feet

Refer to Figure 4-6-1A and Figure 4-6-1B for the impacted tributary names and locations and Table 4-1 for the individual impacted stream length summary.

Section 5.3 of this document discusses the need for a fresh water impoundment and presents reasons that aquatic impacts associated with impoundment development could not be avoided. It also presents rationale used for selecting the proposed Woodruff site. Stream impacts associated with impoundment development were minimized by selecting one single site providing the required reservoir capacity (as opposed to multiple small impoundments) thereby minimizing the number of stream valleys used for water storage.

Access to the water supply impoundment site will be from S.R. 0018 via a proposed access road. Construction of the access road will encroach on four channels: intermittent Tributary 40645-U and ephemeral Tributaries 40645-T, 40645-S and 40645-R. Refer to table 4-1 for the lengths of each channel to be impacted. An access road to the water supply impoundment could not be located in a manner that avoids crossing the ephemeral channels noted above. Moving the road entrance south to the location of an apparent unimproved jeep trail to avoid the tributaries was considered but was determined to be not feasible. The length of road needed to traverse the elevation differential from the entrance to the dam crest at a reasonable and safe roadway grade (12% maximum) makes this option not feasible. An entrance location in the vicinity of the sedimentation pond also was considered, but was determined to be not feasible since the road would have to cross through the Woodruff Cemetery. As a result, crossing the ephemeral channels could not be avoided by road construction. The impacted length of channels was minimized by providing efficient roadway designs that minimize the lateral extent of disturbance within the ephemeral channels.

4.6.2 Impact Area No. 18: Water Intake Structure (South Fork Ten Mile Creek)

Construction of the water intake structure will involve construction of a reinforced concrete weir across the stream along with an adjacent pump house equipped with a wet well. The final location of the weir has not been established, but it will be located within the section of stream indicated on Figure 4-6-2. Included on Figure 4-6-2 is a conceptual layout and typical elevation view of the facility that will be constructed within the area shown. The weir will have a low flow section that will allow a minimum stream base flow to be maintained. Wetlands will not be impacted by proposed construction.

Refer to section 5.3 of this document for the rationale used to select the site location and the reason construction of the intake could not be avoided. Providing the low flow weir will minimize impacts to South Fork Tenmile Creek and locating the pump house on the north side of the creek will eliminate the need for a stream crossing to access the site.

4.6.3 Impact Area No. 19: Water Supply Pipeline

The water supply pipeline from the intake pump house to the water impoundment will be installed within the S.R. 0018 right of way for the majority of the line. The line will parallel S.R. 0018 until reaching the proposed water impoundment access road, at which point, the supply line will cross S.R. 0018 and continue along the impoundment access road to its discharge location at the impoundment. Refer to Figure 4-1 for the overview plan which illustrates the entire alignment of the proposed waterline.

Waterline installation between the pump house and the water impoundment will cross three major tributaries: South Fork Tenmile Creek, Hoge Run and House Run. At these locations the pipeline will be installed under the streams by boring rather than trenching methods to avoid impacting the stream. Refer to Figure 4-6-3A for plan views and details of these proposed stream crossings.

Impacts resulting from the pipeline installation will be limited primarily to the tributaries conveying hillside runoff under S.R. 0018 via pipe culverts. Nine such crossings will be required. Eight of these nine crossings will occur on the upstream side of the existing roadway culverts, and will be limited to 15 linear feet of stream disturbance. The tenth crossing will occur at Tributary 40645, adjacent to the water impoundment access road, on the southern side of S.R. 0018. The stream impact length at this location will be 20 linear feet because installation of two waterlines will be required. Figure 4-6-3B.1 and Figure 4-6-3B.2 presents plan drawings and details of each crossing area. Disturbed sections of stream channel will be returned to their "pre-construction" condition after the pipeline is installed. Positive drainage will be returned to the existing roadway culverts.

The total impacted stream lengths by classification type for the water supply pipelines are as follows:

- Perennial: 80 linear feet
- Intermittent: 30 linear feet
- Ephemeral: 30 linear feet

Refer to Table 4-1 for the listing of the Tributary names and Figures 4-6-2A.1 and 4-6-3B.1 for the impact locations.

The section of water supply pipeline extending from the impoundment to the preparation plant also will cross House Run as discussed previously. The crossing will occur adjacent to a proposed concrete box culvert within Impact Area No. 13. The section of pipeline crossing House Run will be installed during the concrete box installation; therefore, stream impacts resulting from pipeline construction were discussed with the culvert under Section 4.4.1.

Stream and wetland impacts by the proposed water pipelines were minimized by selecting an alignment within the Right-of-Way of an existing roadway, S.R. 0018. The alignment selected for the water line to the water tanks also was minimized by limiting impacts to one crossing at Tributary 40645 which could not be avoided. The portion of waterline crossing Tributary 40635 (House Run) will be installed concurrently with the proposed concrete box culvert (Impact No. 13), thus eliminating a new impact. Impacts to the major tributaries will be avoided by installing the pipeline under the streams by boring methods as specified on Figure 4-6-3A.

4.7 IMPACT AREAS NO. 20A AND 20B: COAL REFUSE DISPOSAL AREAS

Raw coal removed from the mine must be cleaned in a coal preparation plant to remove impurities such as rock, clay, and various other mineral impurities before it is suitable for market. The resultant coarse and fine material is commonly referred to as coal refuse. Coal refuse has no market value and therefore must be disposed in an environmentally safe manner.

FMLLC intends to develop two new coal refuse disposal areas. Site CR-1B, is a relatively small valley located just west of the proposed preparation plant site. This site will receive all coal

refuse generated during initial, development, mining operations. Site CR-1B also will receive coarse coal refuse generated during post-development mine operations. Refer to Figure 4-1 for the location of this site. When longwall mining begins and coal production significantly increases, coarse and fine coal refuse will be disposed in a slurry impoundment to be developed at a site referred to as Site R-3. See the Figure 4-1 overview map for the Site R-3 location. Fine coal refuse slurry will be pumped via a pipeline into the Site R-3 valley upstream of an impounding structure constructed of coarse coal refuse. Excess coarse coal refuse not needed for impoundment construction will be disposed at Site CR-1B.

The proposed project will generate up to 3.3 million cubic yards per year of coal refuse (at full production) requiring disposal. Because the disposal facilities must provide a sizeable amount of storage capacity, the disposal areas must be valley fill type sites. This causes unavoidable impacts to jurisdictional waters of the U.S. However, disposal area designs will include numerous measures to minimize impacts as described below:

- The disposal areas will be designed to maximize coal refuse capacity over each footprint. This will result in the lowest impact to waters of the U.S. per cubic yard of refuse disposed, which indicates optimal use of the proposed facility development. This approach is consistent with PADEP's guidance document on coal refuse disposal site selection that states: "it is better to have a few large coal refuse disposal areas than numerous small coal refuse disposal sites".

- Disposal area CR-1B will extend the life of the slurry impoundment and thereby reduce the number of higher-hazard slurry impoundments built during the total mine life. It will receive coarse coal refuse that otherwise would be disposed within the slurry impoundment pool area needed for fine coal refuse slurry.

- Areas that will receive coal refuse will be covered with a low-permeability liner to reduce infiltration.

- A network of underdrains will be constructed along the center of the major valleys below the facility liners to carry base stream and spring flow under the disposal areas and downstream treatment ponds.

- Coarse coal refuse embankment structures will be provided with an internal drainage system to control seepage and minimize the head on the liner. Seepage collected by this system will be either conveyed to lined treatment ponds or, at Site R-3, re-circulated back to the slurry impoundment.

- Final coal refuse surfaces will be provided with a vegetated low-permeability cap to prevent infiltration and erosion.

Aquatic impacts expected with development of the two disposal sites are defined in the following subsections.

4.7.1 Impact Area No. 20A: Disposal Area CR-1B

The CR-1B valley contains Tributary 40636 and contributing tributaries, all of which are unnamed tributaries to House Run. Presented as Figure 4-7-1 is a site plan of this Impact Area. Included as part of the disposal facility is a treatment pond that will be constructed downstream of the disposal area. The pond will encroach on an additional segment of Tributary 40636 adjacent to Bristoria Rd. (S.R. 3020). Total impacted stream lengths by classification type are as follows:

- Perennial: 3,902 linear feet
- Intermittent: 116 linear feet
- Ephemeral: 2,432 linear feet

Refer to Figure 4-7-1 for the impacted tributary names and locations and Table 4-1 for the individual impacted stream length summary.

4.7.2 Impact Area No. 20B: Disposal Area R-3

FMLLC proposes to develop a slurry impoundment with associated sedimentation/treatment pond within the Hoge Run Watershed area upstream of the slope pad. Presented as Figure 4-7-2A, 2B, 2C, and 2D are site plans showing proposed development. This disposal area is being referred to as Site R-3. It encompasses approximately 23,682 linear feet of Tributary 40632 (Hoge Run) and contributing tributaries. Total impacted (filled) stream lengths by classification type are as follows:

- Perennial: 12,893 linear feet
- Intermittent: 1,962 linear feet
- Ephemeral: 8,827 linear feet

Refer to Figure 4-7-2A through 4-7-2D for the impacted tributary names and locations and Table 4-1 for the individual impacted stream length summary.

Proposed development within Site R-3 also will impact eight wetlands. Wetlands R3-1, R3-2, R3-3, R3-4, R3-5, F-16 F-19 and HOG-3 will be filled by development of this facility. The total wetland impact is 0.480 acres.

Construction of the disposal facility sedimentation/treatment pond will involve widening and deepening Sediment Pond #6 to the configuration shown on Figure 4-7-2A. Revising Pond #6 to accommodate the treatment of disposal facility runoff reduces the disturbed area that otherwise would result if a completely separate pond were constructed in addition to Pond #6. The disposal facility sediment/treatment pond needs to be situated at an elevation lower than the disposal facility to receive facility runoff and it needs to be the approximate size shown to handle the drainage area directed to it. As indicated on Figure 4-7-2A, the proposed pond will encroach within the Hoge Run stream channel. Alternate pond layouts that would allow Hoge Run to be located to either side of the valley were considered but were determined to be not feasible.

Relocating Hoge Run to the southern side of the valley and shifting the pond to the north would require considerable cut on the northern Hoge Run valley wall that would impact the watershed of Tributary 40634, an EV stream. Maintaining Hoge Run on the northern side of the valley and shifting the pond south would require extensive excavation of the southern valley wall that would remove the lower portion of the haul road embankment. FMLLC also explored the feasibility of reducing the width of the pond to facilitate its construction south of the Hoge Run channel. This option was eliminated from further consideration because the pond length increase that would be required to maintain pond capacity would result in encroachment of the EV stream immediately downstream (Tributary 40634).

4.8 RAILROAD TRACK SIDINGS

FMLLC plans to construct two track sidings dedicated to loading operations for coal produced by Foundation Mine from the Pittsburgh seam. The sidings are designated as Unit Train Siding Track 1 (T1) and Unit Train Siding Track 2 (T2). One siding will be a primary loading track; the other a bypass / staging track. The rail sidings will be owned and operated by FMLLC and will be constructed parallel to the two existing Norfolk Southern (NS) tracks known as 'NS Main line' and 'White Cottage Siding'. The proposed rail sidings also will have a 15-foot wide access road and drainage collection channels that will run parallel with the sidings for the entire length of the expansion. FMLLC rail sidings have been engineered based on the Norfolk Southern design standards and begin at a point on the NS Main Line approximately 10,200 feet south of the batch weigh loadout and continue north from the batch weigh loadout approximately 9,200 feet to reconnect with the NS main line.

To facilitate FMLLC loadout requirements and mining production rates, rail siding lengths were determined based on a design train load of 15,000 tons per 150 car train. The rail siding will be required to accommodate two empty 150 car trains prior to the batch weigh loadout to the south and one fully loaded 150 car train after the batch weigh loadout to the north. The additional FMLLC rail siding will implement a bypass option which circumvents the loadout structure if required and will provide the additional rail car stacking required for operations.

The FMLLC rail siding construction project also will provide a new Norfolk Southern track siding designated as Track 1 (N1) to upgrade the 'White Cottage Siding' and will provide an option to shift a portion of the existing 'NS main line' to avoid potential geotechnical issues at the existing NS track location. The main line track siding shift is designated as Track 2 (N2). Design criteria (i.e., unit train design speed, maximum horizontal curvature, maximum compensated grades for empty and loaded trains, etc.) ultimately govern the track alignment and design.

The proposed rail siding alignment, which parallels the existing Norfolk Southern tracks, was selected due to the reduced aquatic impacts that would be realized by locating the proposed track sidings along an existing rail alignment rather than in a new undeveloped location. By utilizing many of the existing drainage structures already servicing the existing NS tracks, aquatic impacts were minimized to primarily culvert extensions and stream diversions. Due to the nature of the topography, the proposed track sidings will be constructed primarily in cut which will generate a

substantial volume of excess material. To further reduce aquatic impacts that would be realized in valley fill options, the excess soil will be stockpiled at the top of adjacent hilltop ridges, above the headwaters of most of the existing streams. At some locations of the proposed track sidings, existing fill embankments will need to be widened. Culvert extensions will be used to convey existing stream flow in these stream fill areas.

Further discussion of the rail siding stream/wetland encroachments are detailed in the subsections that follow.

ENCROACHMENTS TO THE SOUTH OF THE BATCH WEIGH LOADOUT

4.8.1 Impact Area No._21: Tributaries 40643-O and 40643-G

Tributaries 40643-O and 40643-G are ephemeral channels discharging into existing Norfolk Southern drainage culverts. The existing drainage pipe culverts (24-inch & 36-inch CMPs) convey surface runoff under the existing NS tracks and ultimately to Garner Run (Tributary 40643). The existing pipe culverts will be abandoned and grouted in place based on the proposed construction. Impacts to tributaries 40643-O and 40643-G will occur upstream from the existing culverts. Refer to Figure 4-8-1 for proposed impacts and pipe locations.

Approximately 92 linear feet of 40643-O (ephemeral) and 136 linear feet of 40643-G (ephemeral) will be excavated as a result of proposed grading that will be required for rail siding construction. Due to the existing steep slopes in this area and the corridor width required for the rail siding, access road, and drainage collection channel, both sections of these tributaries will need to be removed to the limits shown in Figure 4-8-1. Drainage along the proposed track sidings and cut slopes will be collected in the proposed channels CC-RR26 and CC-RR30 and conveyed to Garner Run through proposed Culvert 539+65 and Culvert 586+72.

Minimum track separation and maximum cut slope designs were implemented in these areas to minimize any additional aquatic impacts. Additionally, all impacts were limited to the eastern side of the existing Norfolk South mainline track.

4.8.2 Impact Area No. 22: Tributaries 40647-T1j1 and 40647-T1j3

Tributaries 40647-T1j1 and 40647-T1j3, both unnamed ephemeral channels, reside within an area requiring drainage and sediment control for excess Soil Stockpile No. 9. The upper reaches of these two ephemeral channels will be impacted by construction of Sediment Pond P5. Refer to Figure 4-8-2. Approximately 34 linear feet of Tributary 40647-T1j1 and 60 linear feet of Tributary 40647-T1j3 will be removed as part of pond embankment construction.

Minimizing aquatic impacts in this area required the sediment pond to be constructed on the ridge as high as possible to avoid the stream valley and additional impacts. The pond was located as high as possible while maintaining positive drainage from the stockpile perimeter channels. As a result, encroachments were limited to the upper reaches of the two ephemeral

channels. Additionally, the pond was designed to provide the minimum required storage capacities and the pond's length to width ratio was increased to further reduced impacts.

4.8.3 Impact Area No. 23: Tributaries 40646 and 40647

Tributary 40647, a perennial stream known as Grinage Run, flows under the existing Norfolk Southern railroad embankment through a 144-inch CMP culvert and discharges into Garner Run. Tributary 40646, an unnamed intermittent stream, flows parallel to Grinage Run Road, passes under the existing NS rail line through a 60-inch CMP, and discharges into Garner Run. Both streams are located within the area proposed for a widened embankment that will be needed to provide adequate space for: the two Foundation track sidings, one NS track siding, and 15-foot wide access road, including guiderail installation for safety. Both tributaries within the embankment widening area will require culvert extensions. Refer to the Figure 4-8-3 site plan.

The 144-inch CMP will be extended (Culvert 535+75) to carry Tributary 40647 flows under the proposed fill embankment area. Proposed Culvert 535+75 will be 67 feet in length and will impact approximately 85 linear feet of Tributary 40647. Additionally, Tributary 40646 will be routed through a proposed 60-inch CMP (Culvert 532+50) extension. Culvert 532+50 will be 40.5 feet in length and will impact approximately 51 linear feet of Tributary 40646. Both impact lengths for the two culvert extensions account for collection channel construction at the inlets of the culverts.

Garner Run, Tributary 40643, flows in a northern direction and parallels the Norfolk Southern railroad on the western side of the existing fill embankment. Development options on the western side of the existing fill embankment were not pursued due to the increased number of stream impacts not only to Garner Run, but also to its contributing tributaries. To minimize aquatic impacts, all construction will be limited to the eastern side of the existing NS tracks for the embankment widening. No disturbance or impacts will be realized on the western side of the existing embankment adjacent to Garner Run.

4.8.4 Impact Area No. 24: Wetlands GRI-1 and F-1

The railroad embankment widening and adjacent collection channel construction proposed in the vicinity of Tributaries 40646 and 40647 will encroach into Wetlands GRI-1 and F-1 as shown on Figure 4-8-4. Approximately 0.050 acre of the 0.07-acre Wetland GRI-1 area will be removed and Wetland F-1 (0.003 acre) also will be removed in its entirety. The total wetland area expected to be lost as a result of the proposed construction is 0.053 acre.

Garner Run, Tributary 40643, flows in a northern direction and parallels the Norfolk Southern railroad on the western side of the existing fill embankment. Development options on the western side of the existing fill embankment were not pursued due to the increased number of stream impacts not only to Garner Run, but also to its contributing tributaries. To minimize aquatic impacts, all construction will be limited to the eastern side of the existing NS tracks for

the embankment widening. No disturbance or impacts will be realized on the western side of the existing embankment adjacent to Garner Run.

4.8.5 Impact Area No. 25: Tributary 40643-B

40643-B is an unnamed tributary which begins on the eastern side of the existing Norfolk Southern rail line. It includes both perennial and ephemeral sections. Tributary 40643-B conveys up-gradient drainage under the existing NS rail line through a 36-inch CMP culvert and discharges into Garner Run. The existing culvert pipe is approximately 166 feet in length and also collects runoff from the existing NS tracks.

The tributary section up-gradient of the existing culvert is intermittent and is located within an area requiring construction of a widened fill embankment to provide adequate room for the two proposed Foundation track sidings, one NS track siding, and access road as described previously. The tributary will be carried under the embankment widening area via a culvert extension. Refer to Figure 4-8-5.

A 36-inch CMP culvert extension (Culvert 511+57) will be constructed to carry the stream under the proposed fill embankment. Proposed Culvert 511+57 will be 64 feet long and will impact approximately 84 linear feet of the intermittent portion of Tributary 40643-B. Additionally, track side drainage from the north and south will be introduced into Tributary 40643-B at the inlet of proposed culvert extension 511+57. This additional drainage will be supplied from proposed collection channels CC-RR20 and CC-RR21A.

One additional impact will occur within the ephemeral section of tributary 40643-B near its headwaters. Excess cut material will need to be stored along the top of the ridge above Tributary 40643-B and a temporary haul road crossing tributary 40643-B will be required to access the excess soil stockpiles. This road crossing will be temporary and will impact approximately 30 linear feet of ephemeral channel. The crossing will consist of two 36-inch CMP pipes placed within the existing tributary's invert to facilitate construction of a crossing over the stream. Upon completion of the excess soil stockpiles, the temporary stream crossing will be removed and the tributary returned to its original state. Refer to Figure 4-8-5 for the impact locations and the temporary stream crossing detail.

Garner Run, Tributary 40643, flows in a northern direction and parallels the Norfolk Southern railroad on the western side of the existing fill embankment. Development options on the western side of the existing fill embankment were not pursued due to the increased number of stream impacts not only to Garner Run, but also to its contributing tributaries. To minimize aquatic impacts, all construction will be limited to the eastern side of the existing NS tracks for embankment widening. The track access road width was held to a minimum and safety guiderail will be installed at the top of the fill embankment. No disturbance or impacts will be realized on the western side of the existing embankment adjacent to Garner Run.

ENCROACHMENTS TO THE NORTH OF THE BATCH WEIGH LOADOUT

4.8.6 Impact Area No. 26: Tributaries 40628-H, 40628-H3 and 40628-H4 and Wetland: F

Tributary 40628-H is an unnamed intermittent stream which discharges into McCourtney Run. This tributary passes under the NS main line through an existing 36-inch CMP culvert which is 108 feet in length. See Figure 4-8-6. The proposed widening to accommodate the two Foundation track sidings, one NS track siding and 15-foot wide access road will require the culvert to be relocated. The existing culvert will be abandoned and grouted in place. As indicated on Figure 4-8-6, approximately 59 linear feet of the perennial Tributary 40628-H, 76 linear feet of ephemeral Tributary 40628-H3, and 88 linear feet of intermittent Tributary 40628-H4 will be impacted as a result of the proposed construction. Ephemeral Tributary 40628-H3 and intermittent Tributary 40628-H4 will be removed in their entirety. The undisturbed portion of the existing stream 40628-H will be rerouted through a proposed culvert (Culvert 482+48) to convey flow under the proposed construction area to McCourtney Run. All up-gradient segments of Tributary 40628-H and its associated tributaries will remain undisturbed. Furthermore, the downstream (perennial) segment of Tributary 40628-H also will remain undisturbed. Refer to Figure 4-8-6 for stream impact locations.

Wetland F also will be impacted due to its proximity to the proposed track sidings and the required cut slope for the track siding construction. Wetland F will be lost in cut in its entirety and the removal will result in a loss of 0.023 acre of wetland (refer to Figure 4-8-6).

McCourtney Run, Tributary 40628, flows in a northern direction and parallels the Norfolk Southern railroad on the western side of the existing fill embankment. Development options on the western side of the existing fill embankment were not pursued due to the increased number of stream impacts not only to McCourtney Run, but also to its contributing tributaries. To minimize aquatic impacts, all construction will be limited to the eastern side of the existing NS tracks. The track access road width was held to minimum. No disturbance or impacts will be realized on the western side of the existing NS track adjacent to McCourtney Run. Also, steeper cut slopes were designed due to the presence of suitable rock, further minimizing up-gradient impacts.

4.8.7 Impact Area No. 27: Tributaries 40631, 40631-P, 40628-UNT4, 40628-UNT6, and 40628-UNT10

These five tributaries reside within an area requiring the widening of an existing fill embankment to provide adequate space for two proposed Foundation track sidings, one NS track siding, NS main line alternate alignment, and access road with guiderail installation for safety. Encroachment on four of these tributaries will require culvert extensions. Refer to Figure 4-8-7 for the impact locations.

Tributary 40631 is an unnamed perennial stream which discharges into McCourtney Run. This tributary passes under the existing railroad fill embankment through a 60-inch CMP which is 201 feet in length. Embankment widening will require a 68.5-foot long culvert extension (Culvert 453+61) and will impact approximately 100 linear feet of this tributary. Tributary 40631-P, a

contributing ephemeral stream channel, also will be removed in its entirety due to the embankment widening. The resulting stream channel impact length for 40631-P will be 183 linear feet. Track side drainage from the north and the south will be introduced into Tributary 40631 at the inlet of the proposed culvert extension. This additional drainage will be supplied from proposed collection channels CC-RR12 and CC-RR11. The up-gradient portion of Tributary 40631 and all associated tributaries will remain undisturbed.

Tributary 40628-UNT4 is an unnamed perennial stream which discharges into McCourtney Run. This tributary passes under the existing railroad fill embankment through a 54-inch CMP culvert which is 187 feet in length. Embankment widening will require extension of this culvert (Culvert 451+10) and will impact approximately 85 linear feet of Tributary 40628-UNT4. The proposed culvert extension is 68.5 feet in length. Track side drainage from the north and south will be introduced into Tributary 40628-UNT4 at the inlet of proposed culvert extension 451+10. This additional drainage will be supplied from proposed collection channels CC-RR9 and CC-RR10. The up-gradient portion of Tributary 40628-UNT4 and all contributing tributaries will remain undisturbed.

Tributary 40628-UNT6 is an unnamed ephemeral stream which discharges into McCourtney Run. This tributary passes under the existing railroad fill embankment through a 30-inch CMP which is 248 feet in length. Embankment widening will require installation of a 60-inch diameter manhole (MH-1) and 75 feet of storm sewer extension to intercept the existing stream. Approximately 106 linear feet of this tributary will be impacted and the impacted portion will be rerouted through the proposed storm sewer (culvert) extension. Track side drainage from the north and south will be introduced into Tributary 40628-UNT6 at the inlet of the proposed storm sewer extension. This additional drainage will be supplied from proposed collection channels CC-RR7 and CC-RR8. The up-gradient portion of Tributary 40628-UNT6 will remain undisturbed.

Tributary 40628-UNT10 is an unnamed intermittent stream which discharges into McCourtney Run. This tributary passes under the existing railroad fill embankment through a 30-inch CMP which is 187 feet in length. Embankment widening will require extension of this culvert (Culvert 445+47) and will impact approximately 75 linear feet of this tributary at this location. The proposed culvert extension is 43 feet long. Track side drainage from the north and the south will be introduced into Tributary 40628-UNT10 (ephemeral) at the inlet of the proposed culvert extension. This additional drainage will be supplied from proposed collection channels CC-RR5A and CC-RR6. Construction of Temporary Sediment Pond P1 will impact an additional 70 linear feet of Tributary 40628-UNT10 (ephemeral) near its headwaters. The pond is needed to control sediment in runoff from the excess soil stockpiles located to the east. The total ephemeral length of Tributary 40628-UNT10 to be impacted is 145 linear feet. Refer to Figure 4-8-7.

McCourtney Run, Tributary 40628, flows in a northern direction and parallels the Norfolk Southern railroad on the western side of the existing fill embankment. Development options on the western side of the existing fill embankment were not pursued due to the increased number of stream impacts not only to McCourtney Run, but also to its contributing tributaries. To minimize aquatic impacts, all construction will be limited to the eastern side of the existing NS tracks for

the embankment widening. The track access road width was held to a minimum and guiderail will be installed at the top of the fill embankment for safety. No disturbance or impacts will be realized on the western side of the existing embankment adjacent to McCourtney Run. Impacts related to Temporary Sediment Pond P1 construction were minimized by placing the pond as far up slope as possible while still maintaining positive drainage to the pond. The pond size was kept to the minimum required for sediment and drainage control (contributing drainage area of 30.60 acres), and the orientation of the pond was designed to reduce impacts to the extent practicable.

4.8.8 Impact Area No. 28: Tributaries 40628-W, 40628-UNT9, and 40628-UNT9a

Tributary 40628-W is an ephemeral channel that conveys hillside runoff to an existing 30-inch Norfolk Southern drainage culvert. The existing pipe culvert conveys drainage under the NS track and ultimately to McCourtney Run. The existing pipe culvert will be abandoned and grouted in place based on the proposed construction and impacts to this tributary will occur upstream from the existing culvert. Approximately 172 linear feet of 40628-W (the entire ephemeral length upstream of the existing 30-inch culvert) will be removed as a result of proposed grading that will be required for rail siding construction, maintenance road and collection channel CC-RR3 as shown in Figure 4-8-8. Due to the existing steep slopes in this area and the corridor width required for the rail siding, access road, and drainage collection channel, this impact could not be avoided.

Tributaries 40628-UNT9 and 40628-UNT9a (upstream of the existing 24-inch culvert) are ephemeral channels discharging into an existing Norfolk Southern drainage culvert. The existing drainage pipe culvert (24-inch CMP) conveys surface runoff under the existing NS tracks and ultimately to McCourtney Run. The existing pipe culvert will be abandoned and grouted in place and replaced by a new culvert (Culvert 418+25) that will discharge at the same location as the existing culvert. Refer to Figure 4-8-8.

222 linear feet of ephemeral Tributary 40628-UNT9 upstream of the existing 24-inch culvert will be removed by proposed widening required for the track sidings, by the 15-foot wide maintenance road, and by collection channel CC-RR2. Ephemeral Tributary 40628-UNT9 parallels the existing NS track and is located entirely within the track siding construction area. Therefore, this impact could not be avoided. Additionally, 128 linear feet of ephemeral Tributary 49628-UNT9a upstream of the existing 24-inch culvert will be impacted by track widening and the adjacent proposed cut slope. The up-gradient section of Tributary 49628-UNT9a will remain undisturbed and the remaining flow in Tributary 49628-UNT9a will be redirected to proposed Culvert 418+25.

A small amount of fill and a rock outlet apron will be constructed on the downstream side of the existing 24-inch CMP culvert to accommodate the proposed Culvert 418+25 discharge location. This discharge location will impact a short section of ephemeral channel 40628-UNT9 (8 linear feet) and an additional 12 linear feet of intermittent channel 40628-UNT9. Total impacted stream lengths by classification type are as follows:

- 172 linear feet of ephemeral Tributary 40628-W.
- 12 linear feet of intermittent Tributary 40628-UNT9 and 230 linear feet of ephemeral Tributary 40628-UNT9.
- 128 linear feet of ephemeral Tributary 40628-UNT9a.

McCourtney Run, Tributary 40628, flows in a northern direction and parallels the Norfolk Southern railroad on the western side of the existing fill embankment. Development options on the western side of the existing fill embankment were not pursued due to the increased number of stream impacts not only to McCourtney Run, but also to its contributing tributaries. To minimize aquatic impacts, all construction will be limited to the southern side of the existing NS track. The track access road width was held to a minimum (15 feet wide) and the proposed cut slopes were steepened to 1:1 in suitable rock to limit the length of the cut slope and reduce further impact to the up-gradient streams. No disturbance or impacts will be realized on the northern side of the existing NS track adjacent to McCourtney Run.

4.8.9 Impact Area No._29: Tributaries 40628-EE and 40628-X and Wetland F-73

Tributaries 40628-EE is an ephemeral channel and 40628-X is an intermittent channel discharging into McCourtney Run on the northern side of the existing NS track. Tributary 40628-X conveys up-gradient drainage under the NS track through an existing 30-inch CMP culvert. Tributary 40628-EE is solely on the northern side of the NS track and only receives runoff from track side drainage.

The impact to intermittent Tributary 40628-X will consist of a short section of channel construction to provide positive flow from collection channel CC-RR1 required for drainage conveyance within the proposed construction area. This channel construction will result in 35 linear feet of stream impact and will not disturb or impact the existing 30-inch CMP culvert under the existing NS track. The up-gradient section of Tributary 40628-X will not be disturbed and flow from this portion of channel will be directed into the new section of Collection Channel CC-RR1 and conveyed through the existing culvert and ultimately to McCourtney Run. Refer to Figure 4-8-9 for the impact location.

An impact to ephemeral Tributary 40628-EE will be required for construction of a culvert rock outlet apron. Proposed construction will impact 20 linear feet of stream channel at the upstream end. The proposed outlet apron is required to prevent erosion and stabilize the discharge point of proposed Culvert 406+00. Culvert 406+00 is necessary to convey drainage from the proposed widened area required for track siding construction. Hillside runoff collected in channel CC-RR2 will be introduced into Tributary 40628-EE as shown in Figure 4-8-9.

Additionally, a small portion of Wetland F-73 (0.007 acre of the total 0.181 acre area) will be impacted by the cut slope required to construct a turnaround area for the proposed 15-foot wide maintenance road. Throughout the entire length of the track widening project the maintenance road was minimized to a 15-foot width to limit aquatic impacts. Locations for turning maintenance equipment around are limited throughout the project. Since this area is the ending of the track widening project this turnaround is necessary. The turnaround area was sized to the

minimum required for reversing equipment direction while maintain a safe operating distance from the active Norfolk Southern mainline. The cut slopes in this area also were steepened to 1:1 to further reduce the wetland impact.

McCourtney Run, Tributary 40628, flows in a northern direction and parallels the Norfolk Southern railroad on the western side of the existing fill embankment. Development options on the western side of the existing fill embankment were not pursued due to the increased number of stream impacts not only to McCourtney Run, but also to its contributing tributaries. Impacts were minimized in this area by reducing the bench width required for construction in the vicinity of Tributary 40628-X. The proposed widening in this area will be limited to that required for construction of collection channel CC-RR1. Adjacent cut slopes were steepened from 2:1 to 1:1 due to the presence of competent rock. These actions eliminated any additional impacts to the up-gradient portion of the stream, which will continue to flow to McCourtney Run. Impacts to Tributary 40628-EE were minimized by reducing the depth of the proposed culvert to the minimum cover of 36 inches required by Norfolk Southern, thus reducing the culvert's length and keeping the stream impact to only that required for installation of a rock outlet apron within its most upper reaches.

Section 5.0

ALTERNATIVES ANALYSIS (Blocks 22 & 23)

Section 404(b)(1) of the Clean Water Act (CWA) requires that applicants for Individual 404 Permits complete an alternatives analysis for the proposed project. Applicants must select the least environmentally damaging, practicable, alternative or authorization under the CWA by the U.S. Army Corps of Engineers (USACE) will not be permitted. An alternative is practicable if it is available to the applicant and capable of being completed in a cost effective manner and if the alternative is logical in light of the stated project purpose. The applicant also may consider existing technology, the cost of implementing this technology, or the resulting product from the use of said technology.

Under Section 404(b)(1) Guidelines, the least environmentally damaging, practicable, alternative must be chosen. Four considerations that must be used to determine if the project is consistent with the Section 404(b)(1) Guidelines are:

1. 40 CFR 230.10(a) – Whether the proposed project represents the least environmentally damaging practicable alternative on the jurisdictional waters, so long as the alternative does not have other significant environmental consequences.

2. 40 CFR 230.10(b) – Will all state and/or federal environmental criteria be met.

3. 40 CFR 230.10(c) – Will the project result or contribute to significant degradation of the aquatic environment.

4. Have all appropriate and practicable steps been taken to minimize potential adverse environmental impacts of the discharge on the jurisdictional waters.

The goal of this alternatives analysis is to demonstrate that Item 1 has been satisfied by ensuring there are no other practicable alternatives that are less environmentally damaging in light of the proposed project. Items 2, 3, and 4 are addressed in Sections 4.0 and 6.0 of this document.

Alternatives were evaluated for each of the following four main components of the project:

- Shaft, Slope, Coal Handling and Preparation Plant Facilities
- Rail Spur and Batch Weigh Coal Loading Facilities
- Water Supply System Facilities
- Coal Refuse Disposal Areas.

Included among the alternatives discussed below is the “No Action” alternative which was used as a basis to which the preferred alternative was compared. Additional discussion explaining why individual impacts could not be avoided is presented in Section 4.0 of this document.

5.1. SHAFT, SLOPE, COAL HANDLING, & PREPARATION PLANT FACILITIES

Foundation Mining, LLC is proposing to construct a new mining facility near Holbrook to extract coal from their existing Pittsburgh Seam coal reserves in southwest Pennsylvania. Coal will be extracted by longwall mining methods. The coal reserve will be accessed by both a dual compartment vertical shaft and a slope. The dual compartment vertical shaft will be constructed to provide: 1) ventilation for the underground workings, 2) mine employees with access into and out of the mine workings, and 3) access for transporting small equipment and supplies to the mine workings. The slope will be used to transport run-of-mine coal from the underground workings to the raw coal stockpile area where it will be temporarily stored until it can be processed, i.e., "cleaned" at the proposed preparation plant. The slope also will be used to transport equipment and supplies into the underground mine. Shaft and slope areas at the surface will include administrative buildings, supply warehouse, shops, bathhouse, parking and other facilities. Coal handling facilities will include the clean coal storage facilities, conveyors for coal and coal refuse transport, and rail car loading facilities.

5.1.1 No Action Alternative

The "No Action" (No- Build) alternative for this project is continued use of the watershed for activities other than coal extraction that avoid discharge of dredge and fill material into jurisdictional waters. These activities could include on-going logging, silviculture, commercial and industrial development, or other improvements to infrastructure. However, it is unlikely that they could be conducted in a manner that completely avoids stream impacts.

Implementation of the no-action alternative would result in loss of potential income for FMLLC and its employees, as well as loss of local, state, and federal revenues that would be realized from development of the project. It also would result in the loss of a resource needed to produce electricity. The no-action alternative is the environmentally preferred alternative because proposed encroachments into waters of the United States could be avoided; however, this alternative does not meet the purpose and need of the proposed project. The project cannot exist without approval of the state and federal agencies. If the project does not receive approval then none of the benefits or drawbacks will be realized.

For these reasons, the no-action alternative has been rejected.

5.1.2 Site Location Alternatives

Alternative project locations were considered as part of this alternatives analysis. Unlike commercial, residential, and other industrial development, coal mining operations are limited to locations where coal reserves are present, economically recoverable, and in proximity to a transportation system for shipping mined coal to market. Before selecting the proposed surface site (Alternative Site A) for proposed mine surface facilities, two other sites were considered and evaluated. Their locations are shown on Figure 5-1. The two sites are: Alternative Site B,

located further to the west of the proposed surface site, and Alternative Site C, located to the south of the proposed surface site.

Alternative Site C was eliminated from further consideration because it is located south of an existing railroad tunnel that is not wide enough to accommodate construction of the mine rail spur needed for coal loading operations. The Alternative C location also has insufficient surface area overlying FMLLC reserves for the construction of mine surface facilities. As a result, the surface facilities would have to extend onto an area overlying CONSOL Energy's reserves and, therefore, would be subject to undermining.

Site B is not practical since there is no infrastructure near this site such as rail, power, water, and sewer. It would result in much greater environmental impact due to longer conveyors or rail lines through high quality watersheds and watersheds of Ryerson Station Park. Implementation of this alternative would require construction of a new rail corridor – widening of an existing corridor would not be possible as is proposed with Alternative A.

The proposed shaft, slope, coal handling and preparation plant facilities locations were chosen based on careful considerations of several factors including environmental, physical, geographic, transportation, economic, and social constraints.

The proposed site is the best location for recovering FMLLC's Pittsburgh Coal Reserve in Greene County in the most efficient fashion considering locations of other mining operations surrounding the proposed Foundation Mine. Optimizing access to these un-mined coal reserves is a key factor in siting the new proposed mine.

Access to the Norfolk Southern Railroad for transporting coal from Foundation Mine to market played a key role in selecting the mine and preparation plant sites. By locating the surface facilities close to the rail line, the number and lengths of conveyors, access roads and power line corridors associated with the new complex will be minimized; thus minimizing impacts to the environment. FMLLC's goal was to minimize the "footprint" of the mine surface activities site, which generally results in fewer impacts to terrestrial and aquatic resources as well as reduced impacts to the surrounding community.

Locating the shaft, slope and preparation plant complex also was dependent on the availability of parcels of land contiguous to each other so that all elements of the complex could be sited close to each other, thereby requiring less footprint area and consequently less surface disturbance and less impact. The surface facilities have been located on property owned by an affiliate of FMLLC. This FMLLC affiliated property is the composite of many parcels of land that have been acquired via good-faith transactions with private landowners over the past several years. The combined property encompasses about 2,500 acres of contiguous parcels. Sufficient property has been acquired to locate the facilities.

5.2. RAIL SPUR AND BATCH WEIGH COAL LOADING FACILITY

Transporting clean coal offsite by rail will require construction of a rail spur dedicated to Foundation Mine, and a batch weigh loading facility for loading rail cars. The rail spur will include two (2) Foundation Mine tracks for loading unit coal trains and one (1) Norfolk Southern (NS) passing siding track, all being parallel to the NS main track. Each track is approximately 3.6 miles long. The tracks will be built on the east side of the existing NS main track, thereby avoiding impacts to Garner Run and McCourtney Run that parallel the tracks on the west side of the Norfolk Southern Railroad property.

5.2.1 No Action Alternative

The no-action alternative for the "rail spur and batch weigh coal loading facility" would prevent Foundation Mine from transporting clean coal to its customers. Using an alternative method for transporting coal to market is not feasible as discussed in Section 5.2.2 of this document. Without a method for transporting coal to the customers, the project cannot exist. Therefore, the no-action alternative has not been chosen by Foundation Mining, LLC because it does not meet the project's purpose or need.

5.2.2 Truck Transportation Alternative

FMLLC expects Foundation Mine to produce approximately 6,500,000 tons of clean coal per year. One method for transporting coal to the customers is by truck using a clean coal truck load-out facility. However, such a facility is intended for customers requiring a relatively small volume of coal. Approximately 260,000 truck loads per year (or 720 truck loads per day) would be required to transport all of the coal to Foundation Mine's intended customers assuming an average truck load of 25 tons. Foundation Mine's coal customers are primarily electric power companies located a long distance from the mine. The large volume of truck traffic needed would result in adverse impacts to communities along the transport routes. Roadway systems along the transport routes are not designed for that large volume of truck traffic. Using trucks to transport coal would result in increased traffic congestion, noise pollution, and air pollution along the truck routes; and the large volume of truck traffic would decrease the safety of the travelling public. Also, transporting such a large quantity of coal using on-road trucks is not cost effective. The cost to transport the coal using trucks is significantly higher than the cost of rail transportation.

Because of the reasoning described above, the truck transportation alternative is considered to be not practicable and is, therefore, eliminated from further consideration.

5.2.3 Location Alternatives

Alternative locations for the rail spur and batch weigh coal loading facilities were considered as part of this alternatives analysis. While evaluating optimal locations for the shaft, slope, coal

handling and preparation plant facilities, consultations were initiated with Norfolk Southern railroad officials to determine the best conceptual approach for handling and loading coal from a mine producing 6.5 million tons per year of clean coal. That effort resulted in a conceptual plan to locate the preparation plant about 1 mile west of the currently proposed location, as shown on Figure 5-2, and to build an extensive rail loop up Hoge Run and back down through the valley containing Hampton and Macedonia Roads to optimize throughput and minimize rail delays. However, the rail loop would have to cross Exceptional Value (EV) watersheds and would require excavation of approximately 800,000 cubic yards of material to facilitate construction of the rail grade. The majority of that material would have to be placed in stream valleys since the topography of the area does not lend itself to fill sites outside of stream channels. After considering this alternative, it was determined that costs and impacts to the aquatic and terrestrial resources were not justified – that construction of a rail spur and batch weigh coal loading facility near the existing NS main line track, as presently proposed, would have the least impact compared to other locations.

Locating rail facilities near the NS main line enables the shaft, slope, and preparation plant site to be located closer to the NS main rail line as presently proposed, resulting in a more compact mine site layout. As discussed previously, minimizing the "footprint" of proposed mine surface facilities generally results in fewer impacts to terrestrial and aquatic resources. It also reduces social impacts to the surrounding community by promoting minimization of the number and length of conveyors, access roads, and power line corridors associated with the new complex.

5.3. WATER SUPPLY SYSTEM FACILITIES

The water supply system includes a water intake structure, a pipeline, access roads, water storage tanks, and a water supply impoundment. The water intake structure will be located on South Fork Tenmile Creek, within a section approximately 800 feet to 1050 feet downstream of its confluence with Hargus Creek. The water impoundment is located in the valley of an unnamed tributary to Garner Run, approximately 500 feet southwest of the intersection of SR 0018 (Golden Oaks Road) and Grinage Run Road. The preliminary water supply impoundment and associated pool area encompass approximately 67 acres with a holding capacity of approximately 650 million gallons of water. The pipeline is located primarily along the northern edge of the S.R. 0018 Right-of-Way.

5.3.1 No Action Alternative

The no-action alternative for the water supply system would involve eliminating the water intake structure, water pipeline, water supply impoundment, and water storage tanks. The proposed mining operation requires a large, reliable supply of water for basic operations. FMLLC anticipates that the volume of water required for underground mining operations and operation of the preparation plant and other surface facilities will be approximately 1800 gallons per minute (gpm). This value represents an average for 7 days a week, 24 hours a day.

There is no public water source near the project that could supply mine water requirements. Since the mining operation is dependent on a large, reliable supply of water, the project cannot exist without the water supply system. Therefore, the no-action alternative has been rejected because it does not meet the project's purpose or need.

5.3.2 Water Withdrawal From South Fork Tenmile Creek Without an Impoundment

Since the water supply impoundment results in the majority of impacts to jurisdictional water among the components of the water supply system, an alternative that eliminates the impoundment was investigated.

South Fork Tenmile Creek has the largest contributing drainage area of any stream near the proposed Foundation Mine Surface Facilities. A Water Supply Study was performed to evaluate the water supply potential of South Fork Tenmile Creek and to recommend pumping rates and impoundment sizes necessary to support mining operations.

The water supply study demonstrated that flows in South Fork Tenmile Creek are not adequate to provide sufficient water for uninterrupted mining operations without a water supply impoundment. Long periods of low flow occur in summer and fall when stream flow is not sufficient to supply the minimum water necessary for mining operations. Shorter periods of low flow occur all throughout the year when stream flow is not adequate to supply the water necessary for mining operations. In addition, the Pennsylvania Fish and Boat commission requires that a minimum base flow be maintained in the stream equal to 25% of the average daily flow. This requirement further limits the amount of water that can be withdrawn from the stream. The study also showed that South Fork Tenmile Creek would have sufficient water to meet base flow and mining requirements only 45% of the time. Therefore, an impoundment is required to store water to meet demand at times of low stream flow when there is limited or no water available from South Fork Tenmile Creek.

5.3.3 Water Withdrawal From Monongahela River

The nearest water source that may be able to meet the water demand of the proposed mining operations without requiring an impoundment, even during periods of low flow, is the Monongahela River. Using the Monongahela River for water supply would involve construction of a force main from somewhere near Rices Landing, Pennsylvania to the Foundation Mine surface facility site. The force main would be approximately 24.2 miles long and would require several pumping stations.

An alternative is practicable if it is available to FMLLC and is capable of being constructed after taking into consideration cost, existing technology, and logistics in light of the stated project purpose. Constructing the force main from the Monongahela River would result in numerous conflicts with existing utilities, environmental impacts, numerous stream crossings, right-of-way issues, and traffic impacts during construction. The cost of the force main and associated

pumping stations is prohibitive. As a result, this alternative is not considered a practicable alternative and was eliminated from further consideration.

5.3.4 Site Location Alternatives

Initially two alternative locations for the water intake structure, as shown on Figure 5-3, were identified. However, the proposed water intake structure location (Water Intake Option 1) along South Fork Tenmile Creek avoids wetlands and avoids habitat that is particularly desirable for mussels (e.g., at the foot of a riffle area). Because of this, and considering that stream encroachment area essentially would be the same at any location, an alternate location for the water intake (Option 2) was not investigated.

Alternative water storage impoundment locations providing the required storage capacity were investigated. The preliminary target storage capacity was 650 million gallons based on the water supply study results.

Because the impoundment site needs to provide a sizeable amount of storage capacity, the alternative site locations focused on valley fill type sites. Valleys adjacent to the Foundation Mine surface facility were evaluated to determine potential sites and finally to identify the most feasible site for the water impoundment. Initially the three potential sites shown on Figure 5-3 were evaluated; Site Option 1, Site Option 2, and Site Option 3.

5.3.4.1 Impoundment Site Option Comparison

Site Option 1 has a storage capacity of approximately 577 million gallons, which is less than that required to allow mining operations to continue without water shortages. Moreover, Site Option 1 is located within an Exceptional Value (EV) watershed. Because of insufficient storage capacity and EV watershed classification, Site Option 1 was eliminated from further consideration. Numerous other small valleys that are present nearby were eliminated from further consideration as well due to their obvious lack of sufficient storage volume.

Conceptual grading plans for each of the remaining two sites (Site Option 2 and Site Option 3) were developed using available topographic mapping to assess available storage capacity. The grading plans assumed a simplified embankment configuration constructed between the ridge tops. The embankment height generally was limited to about 200 feet. Potential storage volumes estimated for each of the sites are as follows:

Site Option 2: 663 million gallons
Site Option 3: 730 million gallons

As indicated above, both sites will provide the storage volume required for mining operations. Consequently, these two potential sites were subjected to further assessment and comparison based on several factors.

First, both sites were reviewed to determine if either site has an apparent fatal flaw (per 25 Pa. Code § 86.102) relative to facility development. No fatal flaws were identified. A PNDI search indicated the *Amblyscirtes vialis* (Common Roadside Skipper), a "PA Imperiled Invertebrate Species", may be present in the vicinity of Site Option 2; however, further review by PA DCNR indicates no impact is likely. Neither site is within 300 feet of a public building or within 100 feet of the right-of-way of a public road. Although occupied dwellings are located within 300 feet of Site Option 2, the property is owned by Foundation Mining and the dwellings will be vacated prior to construction of the water impoundment. Both the sites are within 100 feet of a perennial stream and would require a waiver and appropriate mitigation.

Site Option 2 and Site Option 3 were further evaluated and compared relative to their potential environmental impacts, public benefits, and other relevant parameters. Parameters chosen for additional evaluation include:

- Streams
- Wetlands
- Residences
- Present Land Use
- Aesthetics
- Public Roadways
- Pipeline Alignment

Streams. Stream impacts were assessed by estimating the length of stream encroachment that would result from impoundment development at each site. Access roadways for maintenance and inspection of the facility were not included as part of the water impoundment impact assessment. The entire site footprint shown at each location on Figure 5-4, (which includes the embankment and pool area and the sediment pond area) was assumed to be impacted. Stream lengths were established based on field delineation. Based on this method, it is estimated that Site Option 2 will impact approximately 11,504 feet of stream of which 4,814 feet is perennial, 1,455 feet intermittent, and 5,235 feet ephemeral. Site Option 3 will impact approximately 6,922 feet of stream of which 1,124 feet is perennial, 683 feet intermittent, and 5,115 feet ephemeral.

Wetlands. Wetlands at each site were field delineated. The locations of wetlands in Site Option 2 and in Site Option 3 are shown on Figure 5-4. Based on field delineation, the Site Option 2 footprint area will impact a total of 0.01 acres of wetlands and denoted as Wetland 40649-W1 on the Figure 5-4; the Site Option 3 footprint area will impact 3 separate wetlands areas, Wetland H, Wetland I and Wetland J. The total wetland impact for Site Options 3 footprint is 0.659 acres.

Residences. Constructing the water impoundment at Site Option 2 would require demolition of one residence along S.R. 0018. However, the impact can be neglected because FM LLC owns all the property on which the residence is situated. Site Option 3 would not impact any residences since there are no residences within this site.

Present Land Use. Present land uses of both sites (Site Option 2 and Site Option 3) are similar. Neither site has areas that have been previously disturbed for industrial or mining activities. There are prime farmland soil types within both site footprints, but no active farms are present on either site. Both the sites are comprised primarily of forestland.

Aesthetics. Aesthetic impacts would be similar for development at either Site Option 2 or Site Option 3. Impoundments at either site would be visible from nearby roads and some nearby residences. An impoundment at Site Option 2 would be easily visible to drivers on S.R. 0018. An impoundment at Site Option 3 may be visible to drivers on S.R. 0018 and on S.R. 3020 (Bristoria Road).

Public Roadways. Neither of the sites will impact public roadways. The embankment and pool area, including the sedimentation pond, at either of the sites will be located further than 100 feet from nearby roads.

5.3.4.2 Pipeline Alignment Comparison

The water supply system proposed will be the source of water for underground mining operations and the preparation plant. For both site options, two potential pipeline alignments were evaluated. One alignment is primarily parallel to the new sewerline proposed to be constructed by Rogersville Sewer District; the other is primarily along the northern side of S.R. 0018. Refer to Figure 5-4A.

The pipeline alignment parallel to the sewerline would be in the floodplain of Hargus Creek, McCourtney Run and Garner Run and would require twenty (20) stream crossings for both Site Option 2 and Site Option 3. This would increase the cost of installation and would limit access for long-term maintenance.

The pipeline alignment paralleling the northern side of S.R. 0018 is preferable since it will be easily accessible for long term maintenance. Moreover this alignment would require nine (9) stream crossings for both Site Option 2 and Site Option 3. The installation cost for this alignment will be less than the alternative alignment paralleling the sewerline.

5.3.4.3 Summary of Impoundment Site Location & Pipeline Alignment Analyses

Based on the Impoundment Site Location comparison discussed above, Site Option 2 and Site Option 3 are rated similar. Site Option 2 is located entirely on property owned by Foundation Mining, LLC, but Site Option 3 is located primarily on property owned by the NS railroad company. NS is not willing to sell this property to FMLLC for constructing the water impoundment. Therefore, Site Option 2 is the only site suitable and available for constructing the water impoundment.

The alternative pipeline alignment analysis indicates that the alignment paralleling the northern side of S.R.0018 is preferable to the alternative pipeline alignment paralleling the sewerline.

5.4. COAL REFUSE DISPOSAL AREAS

Disposal areas to be developed for coal refuse generated by the Foundation Mine operation will include a slurry impoundment (site R-3) for receipt of both fine coal refuse slurry and coarse coal refuse, and a separate embankment-type disposal area (site CR-1B) to receive coarse/combined coal refuse during initial mine operations. The proposed slurry impoundment site (R-3), which encompasses approximately 207 acres, is located north-west (upstream) of the proposed slope facility. Coarse/combined Coal Refuse Disposal site CR-1B encompasses approximately 58 acres and is located west of the proposed slope and preparation plant facility. Use of Site CR-1B for coal refuse disposal will eliminate the need for another slurry impoundment during the 20-year mine life presently anticipated. The locations of Site R-3 and Site CR-1B are shown on Figure 5-5.

5.4.1 No Action Alternative

Raw coal produced in a mine must be cleaned in a preparation plant to remove impurities such as rock, clay, and various other mineral impurities commonly referred to as coal refuse before the coal can be marketed. Coal refuse has no market value and, therefore, must be disposed in an environmentally safe manner. The no-action alternative, i.e., not developing a coal refuse disposal site, would prevent Foundation Mining, LLC from mining coal. Coal refuse generation is an inherent part of the coal mining process and cannot be eliminated. The project cannot exist without a site for coal refuse disposal. As a result, the no-action alternative was not selected because it does not meet the project's purpose or need.

5.4.2 Site Location Alternatives

A separate Site Selection Study/Alternatives Analysis Report has been prepared for the proposed Foundation Mine coal refuse disposal areas. This Report was prepared in accordance with the following:

- CFR Title 40, Part 230; Section 404(b)(1) Guidelines for Specification of Disposal Sites for Dredged or Fill Material.
- Title 33, Part 320; Navigation and Navigable Waters - General Regulatory Policies.
- 25 Pa Code §90.201 through §90.207.
- PADEP Technical Guidance Document (TGD) No. 563-2113-660 "Coal Refuse Disposal – Site Selection" dated February 8, 1999.

Site alternatives analyses were performed for the Foundation Mine to: 1) identify potential disposal sites; 2) evaluate the sites based on environmental, economic, transportation, technical,

and social factors; and 3) select the site(s) determined to be most suitable for disposal facility development. Thirty-one (31) possible disposal sites were identified and evaluated for development of the slurry impoundment; thirty-one (31) for the coarse/combined coal refuse disposal site. Following three rounds of assessment, Sites R3 and CR-1B were identified as most feasible for development of the Foundation Mine slurry impoundment (R3) and coarse/combined coal refuse disposal area (CR-1B). The complete Site Selection Study/Alternatives Analysis Report for the proposed coal refuse disposal areas was submitted on November 9, 2010 to PADEP, USACE, PA Fish and Boat Commission, PA Game Commission, and U.S. Fish and Wildlife Service for approval and was approved for permitting and development by the PADEP on August 18, 2011.

Section 6.0

AFFECTED ENVIRONMENT AND ENVIRONMENTAL IMPACTS (Blocks 22 & 25)

6.1 AREA ECONOMY

The proposed Foundation Mine facility represents a planned commitment by Alpha Natural Resources, Inc. the holding company for Foundation Mining, LLC (FMLLC), to expand operations in Greene County, Pennsylvania. Approximately 1500 people are currently employed at Alpha's Emerald and Cumberland Mines. Through their employment, these workers contribute greatly to the economic health of the region.

Operation of the Foundation Mine is expected to require 500 to 900 salaried and hourly employees. The U.S. Department of Labor estimates Greene County unemployment at 7.9 percent (for August 2011); therefore, the local community would be well-served by the industrial development proposed with Foundation Mine. Moreover, the U.S. Census Bureau 2006-2008 American Community Survey indicates that approximately 50 percent of employed persons 16 years of age or older in Greene County held "blue-collar" type occupations (occupations not classified as management, professional, sales, office, etc.). Proposed construction of the Foundation Mine will provide employment opportunities for additional "blue-collar" workers in Greene County. The types of jobs that will be created are considered high paying jobs in this region as the U.S Census Bureau's estimated median household income in Greene County for the 2006 through 2008 period is $40,206/year while the average mining wage in Greene County is approximately 88% higher at $75,629/year.

Construction of mining facilities at the proposed Foundation Mine site in Holbrook, Pennsylvania will provide financial benefits for Center Township and the surrounding communities. During the three-year construction phase, the project will provide hundreds of temporary positions and employment opportunities for construction workers and existing support/service industry employees. Once operational, the Foundation Mine will fortify the positive impact that mining has on levels of employment, tax revenues, local business traffic, and general community stability and development. The National Mining Association reports that for each new coal mining job created, an additional 3.5 jobs are created somewhere else in the local economy to provide supplies, support, and services for mining related operations.

The projected annual payroll and benefits paid to employees of Cumberland and Emerald Mines are approximately $216 million; that amount is expected increase to approximately $275 million with the additional employees necessary for development of the Foundation Mine. Revenues from wage and occupational privilege taxes, when applicable, will benefit Center Township, Greene County and the surrounding communities. Moreover, the mine employees account for a significant contribution to the local economy through real estate and other local taxes. The proposed Foundation Mine facilities will, through corporate real estate taxes, generate additional revenues for Center Township, the local school districts, as well as Greene County. It is estimated the Cumberland and Emerald Mine operations provide nearly $10 million annually in

the form of federal, state, and local income taxes, sales taxes, property and production taxes, and payroll taxes. It is anticipated that Foundation Mine operation will increase these tax revenues by approximately 30 percent. As Foundation Mine operations advance into Center Township, Greene County, the coal reserves will become active and the township will realize an increased tax benefit. The proposed Foundation Mine surface facilities are required to provide for the viability of the Foundation Mine. The new facilities will provide an additional tax base for the local townships, school districts, and counties. Employees of the Foundation Mine will provide a significant source of tax revenues to the local area.

Employee patronage of local businesses contributes greatly to the economic health of the region. Development of the Foundation Mine assures a continued and increased source of disposable income within the local community, which will bring about continued opportunities for growth in sales volumes, continued development, and the stability of local businesses. Alpha Natural Resources currently spends approximately $176.4 million annually for normal supplies, services, parts, and repairs associated with the Cumberland and Emerald Mine operations. It is anticipated that this spending will increase by at least 30 percent with development of the Foundation Mine. Local manufacturers, vendors, and suppliers provide a majority of this business.

6.2 FISH AND WILDLIFE/LAND USE/LAND COVER

This section of the 404 Permit Application provides information pertaining to the existing land use, land cover, fish, wildlife, and associated aquatic and terrestrial habitats located within the proposed Foundation Mine Project area. A discussion of unavoidable impacts to fish, wildlife and associated habitats that would result from development of the proposed project also is provided. In addition, a brief summary of proposed site reclamation and habitat restoration activities is provided. Detailed information pertaining to existing streams and wetlands and the proposed impacts is provided in Sections 6.3 – Streams and Aquatic Functions and 6.4 – Wetlands and Aquatic Functions. Detailed compensatory mitigation information for unavoidable impacts to aquatic resources is provided in Section 7.0 and Appendix F of this document.

6.2.1 Project Area Description

According to the Greene County website (Thornburg R., n.d., *About Greene County, Location, Geography and Municipality Information* Retrieved Sept. 22, 2011 from (http://www.co.greene.pa.us/secured/gc2/history/aboutGC.htm) Greene County is approximately 89.2 percent rural and encompasses approximately 389,120 acres of land surface, or about 608 square miles. The project area is located within central western Greene County in a rural part of southern Center and northern Jackson Townships near the village of Holbrook, PA. Access to the proposed project area is gained from the city of Waynesburg via S.R. 0021 and S.R. 0018 (Golden Oaks Road) as well as Hoge Run Road, Bristoria Road, and Tower Road, which are the primary local roads within the project boundaries. In addition to the local and state road networks, the project area contains an existing two-track Norfolk Southern Railroad line that runs from southwest to northeast and passes through the southern portion of the project area.

The line is primarily used to transport coal and other raw materials from existing mine operations south of Waynesburg to local and regional markets and distribution centers.

The landscape within the project area and surrounding environment is predominantly deciduous forest and agricultural land. The rolling terrain is dissected by numerous high-gradient first and second order, unnamed streams; and several low-gradient third and fourth order named streams. The stream valleys are generally steeply sloped with narrow valley bottoms. Ground elevations range from approximately 980 feet to over 1,550 feet above mean sea level.

The proposed project area topography and land cover are typical for the region and encompass approximately 1,867 acres that includes portions of five (5) subwatersheds of the upper South Fork Tenmile Creek (40293) watershed and a comparatively minor reach (< 300 l.f.) of the main stem of South Fork Tenmile Creek (SFTC). This acreage represents approximately 0.005% of the total acreage within the county. Additionally, a minor encroachment (< 3.0 acres or 0.16% of the overall project boundary) will fall within the Hargus Creek sub-watershed. This encroachment will facilitate a waterline installation along S.R. 0018, Golden Oaks Rd, and will be constructed within the PennDOT Right-of-Way. Refer to Figure 6-1 and Figure 4-1 Project Overview Map. The SFTC watershed is the major watershed that drains western and central Greene County and encompasses approximately 127,226 acres to its confluence with Tenmile Creek near Clarkesville, PA. The upper portion of the watershed encompasses approximately 13,913 acres to the confluence with Hargus Creek just west of Rogersville, PA.

6.2.2 Chapter 93 Streams Designations

According to PA Code Chapter 93 water quality standards, South Fork Tenmile Creek (SFTC) and its tributary streams above the confluence with Browns Creek (40452) just west of Waynesburg, PA are classified as High Quality Warm Water Fisheries (HQ-WWF) waterways dating back to the initial designation by PA Department of Environmental Protection in 1979. According to PA Code Chapter 93, high quality surface waters are defined in the following terms and conditions (text extracted from PA Code, Chapter 93):

> (a) *Qualifying as a High Quality Water.* A surface water that meets one or more of the following conditions is a High Quality Water.
>
> (1) *Chemistry.*
>
> (i) The water has long-term water quality, based on at least 1 year of data which exceeds levels necessary to support the propagation of fish, shellfish and wildlife and recreation in and on the water by being better than the water quality criteria in § 93.7, Table 3 (relating to specific water quality criteria) or otherwise authorized by § 93.8a(b) (relating to toxic substances), at least 99% of the time for the following parameters:
>
> | | |
> |---|---|
> | dissolved oxygen | aluminum |
> | iron | dissolved nickel |
> | dissolved copper | dissolved cadmium |
> | temperature | pH |
> | dissolved arsenic | ammonia nitrogen |
> | dissolved lead | dissolved zinc |
>
> (ii) The Department may consider additional chemical and toxicity information, which characterizes or indicates the quality of a water, in making its determination.

(2) *Biology.* One or more of the following shall exist:

(i) *Biological assessment qualifier.*

(A) The surface water supports a high quality aquatic community based upon information gathered using peer-reviewed biological assessment procedures that consider physical habitat, benthic macroinvertebrates or fishes based on *Rapid Bioassessment Protocols for Use in Streams and Rivers: Benthic Macroinvertebrates and Fish*, Plafkin, et al., (EPA/444/4-89-001), as updated and amended. The surface water is compared to a reference stream or watershed, and an integrated benthic macroinvertebrate score of at least 83% shall be attained by the referenced stream or watershed.

(B) The surface water supports a high quality aquatic community based upon information gathered using other widely accepted and published peer-reviewed biological assessment procedures that the Department may approve to determine the condition of the aquatic community of a surface water.

(C) The Department may consider additional biological information which characterizes or indicates the quality of a water in making its determination.

(ii) *Class A wild trout stream qualifier.* The surface water has been designated a Class A wild trout stream by the Fish and Boat Commission following public notice and comment.

In addition to the HQ-WWF classification, several adjacent un-named streams abutting or in the vicinity of the Foundation Mine project area including streams 40637, 40638, 40640, 40634, 40633 and 40629 have been recently reclassified by PADEP as Exceptional Value (EV) waterways. According to PA Code Chapter 93, EV surface waters are defined in the following terms and conditions (text extracted from PA Code, Chapter 93):

Qualifying as an Exceptional Value Water. A surface water that meets one or more of the following conditions is an Exceptional Value Water:

(1) The water meets the requirements of subsection (a) and one or more of the following:

(i) The water is located in a National wildlife refuge or a State game propagation and protection area.

(ii) The water is located in a designated State park natural area or State forest natural area, National natural landmark, Federal or State wild river, Federal wilderness area or National recreational area.

(iii) The water is an outstanding National, State, regional or local resource water.

(iv) The water is a surface water of exceptional recreational significance.

(v) The water achieves a score of at least 92% (or its equivalent) using the methods and procedures described in subsection (a)(2)(i)(A) or (B).

(vi) The water is designated as a ‘‘wilderness trout stream’’ by the Fish and Boat Commission following public notice and comment.

(2) The water is a surface water of exceptional ecological significance.

The EV streams originate outside of the project area limits but Tributaries 40634 and 40633 do drain into the project area. Exceptional value tributaries within the project area are identified on

Figures 6-2a through 6-2d, and are located in the Hoge, House and McCourtney Run watersheds. The recent EV classification of these streams by PADEP followed a petition brought by the applicant in June 2008. The petition sought to reclassify the HQ designation of the project area watersheds to the Warm Water Fisheries (WWF) designation. As a result of the subsequent water quality evaluation by PADEP, the streams were redesignated from the HQ-WWF to EV. Additional information regarding the petition and the redesignation of the associated streams is contained in Section 6.3 of this document.

Additional information regarding the water quality, Chapter 93 classifications and designations is provided in Section 6.3 Streams and Aquatic Functions, Section 6.4 Wetlands and Aquatic Functions, and Section 6.7 Surface Water Quality/Chemistry of the application.

6.2.3 Subwatershed Terrestrial Habitat Descriptions

The major subwatersheds of SFTC identified in the project area include portions of: Garner Run (Stream 40643), Hoge Run (40632), House Run (40635), and McCourtney Run (40628). In addition, a relatively small portion of named streams and their tributaries, Grinage Run (40647) and Hargus Creek (40627) are also located within the project area. To provide an overview of existing terrestrial habitats within the project area, an analysis of available PAMAP Land Cover Data for Pennsylvania (Pennsylvania State University, (2005) was conducted using ArcMap Geographic Information Systems (GIS) software. An analysis and brief description of the land use/land cover and physiographic nature of the major watersheds is provided in the following paragraphs:

6.2.3.1 Garner Run (40643) Watershed

The Garner Run watershed is approximately 3,872 acres with approximately 624 acres (16%) of the entire watershed falling within the project boundary. The headwaters and main stem of Garner Run originates in Jackson Township and flows northeast along SR 0018 (Golden Oaks Road) into Center Township, Greene County, Pennsylvania. Garner Run and House Run confluence near the geographic center of the project area with McCourtney Run, which then continues to flow northeast into Hargus Creek

For land cover analysis purposes, a Garner Run sub watershed was developed that excludes the Grinage Run watershed which is a named tributary to Garner Run. The Garner Run sub watershed (minus the Grinage Run portion) is approximately 3,014 acres with approximately 557 acres (19%) of the sub watershed falling within the project boundary. Of the 557 acres, the predominant land cover is forestland/scrub-shrub complex encompassing approximately 469 acres (84%). Forty seven acres (8%) is considered developed lands (combination of high and low density development such as residential, roads, rail road, commercial), and 41 acres (7%) is agricultural lands (Grasslands/Cropland). Within the Garner Run sub watershed portion of the project area, elevation ranges from approximately 1,000 feet along the stream bottom to 1,520 feet on the adjacent hilltops. Of the nearly 1,867 total project acres, approximately 30% occurs

within Garner Run sub watershed. Garner Run and its UNTs are designated under the Chapter 93 Water Quality Standards as HQ-WWFs.

Typical habitat mosaic of the Garner Run watershed within the project and vicinity (Photo courtesy of Bing)

The predominance of the sub watershed consists of well-developed riparian corridors fragmented by rangeland habitat, pasture (grassland) lowlands, low density, rural residential land uses, and transportation corridors. Typical shrub and herbaceous vegetative species include multi-flora rose (*Rosa multiflora*), thistles (*Cirsium spp.*), goldenrods (*Solidago spp.*), wingstem (*Verbesina alternifolia*), Indian hemp (*Apocynum cannabinum*), and various upland grasses. Early-stage successional tree species such as black cherry (*Prunus serotina*), red maple (*Acer rubrum*) and American beech (*Fagus grandifolia*) were observed on the hillsides surrounding the open field areas within the project area. The forested riparian zone consists of mature red maple (*Acer rubrum*), black willow (*Salix nigra*), black cherry (*Prunus serotina*), and American sycamore (*Fagus grandifolia*).

6.2.3.2 Grinage Run (40647) Watershed

The Grinage Run watershed is approximately 858 acres with approximately 67 acres (8%) of the watershed falling within the project boundary. Grinage Run is located at the southwestern quadrant of the project area in Center and Jackson Townships, Greene County, Pennsylvania. The main stem of this stream flows north along T-434 (Grinnage Run Road) and passes beneath

the existing Norfolk Southern Railroad via a culvert to its confluence with the main stem Garner Run. Of the 67 acres, the predominant land cover is forestland/scrub shrub complex encompassing approximately 65 acres (97%), while 1 acre (1%) is considered developed lands (combination of high and low density development such as residential, roads, rail road, commercial), and 1 acre (1%) is agricultural lands (Grasslands/Cropland). Elevations within the watershed range from approximately 1,025 feet along the stream channel to over 1,500 feet at the adjacent hilltops. Of the nearly 1,867 total project acres, approximately 4% occur within Grinage Run watershed. Grinage Run and its UNTs are designated under the Chapter 93 Water Quality Standards as High Quality Warm Water Fisheries (HQ-WWFs).

Typical habitat mosaic of the Grinage Run watershed within the project area. (Photo courtesy of Bing)

The watershed consists primarily of mature deciduous forested areas with areas of agricultural land uses. Well-vegetated riparian corridors consisting largely of black willow (*Salix nigra*) trees and saplings are present along a most of Grinage Run. Successional tree species such as black cherry (*Prunus serotina*), red maple (*Acer rubrum*) and American beech (*Fagus grandifolia*) were observed on the hillsides surrounding the open field lowland areas within the project area. The portion of the watershed within the project area contains predominantly forestlands, hayfields, local roadways and the Norfolk Southern Railroad track and railway embankments.

6.2.3.3 Hoge Run (40632) Watershed

Hoge Run watershed is approximately 965 acres with approximately 626 acres (65%) of the watershed falling within the project boundary. Hoge Run originates in the northern third of the project area and flows south along T-509 (Hoge Run Road) in Center Township, Greene County, Pennsylvania. Of the 626 acres, the predominant land cover is forestland/scrub-shrub complex

encompassing approximately 471 acres (75%), while 18 acres (3%) is considered developed lands (combination of high and low density development such as residential, roads, commercial), 134 acres (21%) is agricultural lands (grasslands/cropland) and 3 acres (less than 1%) is bare surfaces. Within the Hoge Run portion of the project area, elevations range from approximately 1,040 feet along the stream bottom to 1,480 feet on the adjacent forested ridges. Of the nearly 1,867 total project acres, approximately 33% occurs within Hoge Run watershed. Hoge Run and the majority of its UNTs are designated under the Chapter 93 Water Quality Standards as HQ-WWFs. Two unnamed tributaries (40633 and 40634) that drain into Hoge Run are classified as EV watersheds.

Typical mosaic of habitat types within the Hoge Run watershed portion of the project area.(Photo courtesy of Bing)

The watershed consists primarily of old-field and pasture lowlands, with mature successional tree species observed on the hillsides. Much of the riparian zone along Hoge Run and its tributaries have been degraded as a result of intensive farming activities. Typical vegetation species in the watershed include black willow (*Salix nigra*), multi-flora rose (*Rosa multiflora*), thistle *(Cirsium vulgare*), goldenrod (*Solidago spp*.) and various upland grasses.

6.2.3.4 House Run (40635) Watershed

The House Run watershed is approximately 2,918 acres with approximately 331 acres (11%) of the watershed falling within the project boundary. House Run originates in the northern portion of Jackson Township west of Hoge Run and generally flows southeast along SR 3020 (Bristoria Road) in Jackson Township to its confluence with Garner Run in Center Township, Greene County, Pennsylvania. Of the 331 acres, the predominant land cover is forestland/scrub-shrub complex encompassing approximately 257 acres (78%), while 6 acres (2%) is considered developed lands (combination of high and low density development such as residential, roads, commercial), and 68 acres (21%) is agricultural lands (grasslands/cropland). Elevations within the watershed range from approximately 1,100 feet along the stream bottom to 1,530 feet on the adjacent hilltops. Of the nearly 1,867 total project acres, approximately 18% occurs within

House Run watershed. The confluence of House Run and Garner Run form McCourtney Run, which then flows into Hargus Creek. House Run and its tributaries are designated under the Chapter 93 Water Quality Standards as HQ-WWFs. Three UNTs to House Run (40637, 40638 and 40640) are classified as EV streams.

Typical habitat mosaic of the House Run watershed within the project area. (Photo courtesy of Bing)

6.2.3.5 McCourtney Run (40628) Watershed

McCourtney Run watershed is approximately 9,079 acres and is the receiving watershed for the majority of the project area. McCourtney Run originates in Center Township, Greene County, Pennsylvania and flows northeast along S.R. 0018 (Golden Oaks Road) to the confluence with Hargus Creek.

As with the Garner Run watershed, a McCourtney Run sub watershed has been developed for descriptive purposes to aid in the illustration of project area resources. The McCourtney Run sub watershed is approximately 1,333 acres with approximately 262 acres (20%) of the sub watershed falling within the project boundary. Of the 262 acres, the predominant land cover is forestland/scrub-shrub complex encompassing approximately 205 acres (78%). Thirty-three acres (13%) is considered developed lands (combination of high and low density development such as residential, roads, rail road, commercial), and 24 acres (9%) is agricultural lands (Grasslands/Cropland). Of the nearly 1,876 total project acres, approximately 14% occurs within McCourtney Run sub watershed. Elevation ranges from approximately 980 feet along the stream bottom to 1,500 feet on the adjacent hilltops. McCourtney Run and the majority of its UNTs are designated under the Chapter 93 Water Quality Standards as HQ-WWFs. One UNT to McCourtney Run, (40629), is classified as an EV stream.
The watershed consists primarily of old-field and pasture lowlands, with early-stage succession species observed on the hillsides. Relatively narrow, forested riparian corridors exist along the

upper portion of McCourtney Run. The riparian habitat transitions into open field pasture and residential land uses near the confluence with Hoge Run. This land cover type continues downstream to the confluence with Hargus Creek. Typical vegetative species include multi-flora rose (*Rosa multiflora*), thistle *(Cirsium vulgare*), goldenrod (*Solidago spp.*) and various upland grasses. Forested areas within the watershed consist of red maple (*Acer rubrum*), American sycamore (*Platanus occidentalis*), northern red oak (*Quercus rubra*), and black willow (*Salix nigra*).

Typical habitats and land uses along the upper portion of McCourtney Run main stem within the project area. (Photo courtesy of Bing)

6.2.3.6 South Fork Tenmile Creek (40293) Watershed

The South Fork Tenmile Creek watershed originates in the northwestern portion of Green County and flows eastward along the S.R. 0021 corridor through Rogersville, PA. South Fork Tenmile Creek is a fourth order stream and is designated under Chapter 93 Water Quality Standards as an HQ-WWF waterway.

Although the entire project area is within the South Fork Tenmile Creek Watershed, only a small portion, comprising a waterline and associated water intake facility, is located within the mainstem drainage area. The portion of the project area that extends into the South Fork Tenmile Creek is situated along a proposed waterline right of way along S.R. 0021. McCourtney Run flows eastward to the confluence with Hargus Creek. The majority of the watershed consists of commercial and residential land uses. The Norfolk Southern Railroad corridor and areas of old field pasture land also occur along riparian zones. Typical vegetative species include thistle *(Cirsium vulgare*), goldenrod (*Solidago spp.*), wingstem (*Verbesina alternifolia*) and various upland grasses. Riparian forested areas within the watershed consist of predominantly red maple (*Acer rubrum*), American sycamore (*Platanus occidentalis*), northern red oak (*Quercus rubra*), and black willow (*Salix nigra*).

Habitat mosaic of SFTC watershed within the proposed Water Intake project area (Photo courtesy of Bing)

6.2.4 Aquatic Habitats and Fish

The following subsections provide a description of aquatic habitats within the project area capable of supporting fish species and fish sampling results for the major perennial stream systems within the project area.

6.2.4.1 Streams

The locations of the major watersheds within the project area are illustrated on Figure 6-1. These include the perennial main stem segments and tributary streams of Garner Run, McCourtney Run, House Run, Hoge Run, Grinage Run, and South Fork Tenmile Creek. In general, many of the main stem streams and associated riparian areas have been historically degraded by agricultural activities, roadway infrastructure, railroad embankments, utility right of ways, and rural residential land uses. The majority of the larger perennial main stem streams contain persistent stream flows, benthic habitat, channel substrates, and benthic food chain production to support fish species. These streams also provide aquatic habitat for migratory waterfowl such as Canada geese (*Branta Canadensis*) and a variety of ducks (Family Anatidae) and amphibians (Family Amphibia) common to the Greene County region. These animal species tend to inhabit and utilize the slower moving pools, moist banks and densely vegetated riparian areas that exist in compartments throughout the project area.

Typical low gradient stream with forested riparian corridor located within the project area (McCourtney Run).

Typical low gradient stream with agriculture influenced riparian corridor located within the project area (Hoge Run).

Numerous high gradient ephemeral, intermittent, and perennial tributaries also exist within the project area. All discharge into named receiving streams adding base flow hydrology and contributing biomass to the stream ecosystem in the form of coarse particulate organic matter (CPOM) (e.g., leaves and woody debris), fine particulate organic matter (FPOM) (e.g., algae diatoms) and dissolved organic matter (DOM) (e.g., algal cell materials). These materials serve as the basis of the food chain for aquatic faunal communities within the stream ecosystem, and are utilized by lower trophic level primary producers and decomposers (e.g., macroinvertebrates).

Because of the relatively steep topography of the project area, tributary streams are typically high-gradient and provide habitats for fish species adapted to those conditions (e.g., mottled sculpin [*Cottus bairdii*]) (Wallace et. al., 1992). Many of the first and second order tributary streams also contain natural and anthropogenic barriers to fish mobility (e.g., channel headcuts, waterfalls, woody debris dams, plastic and metal cross pipes, and culverts).

As a result, only the lower extents of low gradient perennial stream segments contain sufficient year-round flow to support fish species. Prolonged elevated stream flow typically occurs within portions of spring and fall as winter snow melt and/or increasing precipitation.

Lower reach of a typical high-gradient un-named perennial tributary stream (40631) to McCourtney Run

(Photos provided courtesy of WPI, Inc.)

6.2.4.2 Wetlands

The project area contains forty-five (45) wetland systems totaling approximately 2.676 acres, which are located primarily along the floodplains of existing streams, adjacent bottomlands and valley hillsides. The majority of the wetlands are palustrine emergent wetlands of less than 0.1 acres, and do not contain open water components capable of supporting fish species. Two (2) wetland systems (Wetland H [0.380 acres] and Wetland I [0.236 acres]) were the remnants of man-made ponds and contain deep water habitat (estimated at > 3 feet in depth) capable of supporting fish. Fish species (e.g., panfish and bass [Family Centrarchidae]) amphibians (e.g., leopard frog [*Rana pipiens*]), and various salamanders (Order Caudata) were observed utilizing these open water habitats during field investigations. Water retention and inundation in these wetlands has been augmented by beaver dams at the impoundment outflows. Various salamanders were observed along and within these open water habitats during field investigations. The open water portion of these wetlands has been augmented by recent beaver activity and channel damming activities at the outflow of the impoundments.

Wetland I located within the project area south of the Norfolk Southern Railroad
(Photo courtesy of WPI, Inc.)

Additional wetland data, proposed impacts, and proposed compensatory mitigation for unavoidable impacts to wetland resources are provided in Section 6.4, Section 7.0, and Appendix F.

No other aquatic resources were identified within the proposed project area.

6.2.4.3 Existing Fish Communities

To assess the presence, community composition, and relative diversity and abundance of fish populations within the project area, electrofishing surveys were conducted at seven (7) established Appendix B sampling sites located along the main stems of the project area perennial streams from 2007 through 2010. For the purposes of characterizing the existing fish populations within the sampled streams, only the most recent 2010 survey data for the fish sampling sites are presented. In addition to the seven (7) sample sites within the project area, one electrofishing sample was conducted in June 2011 at a site on South Fork Tenmile Creek, approximately four (4) miles downstream of the proposed water intake project area.

6.2.4.3.1 Fish Sampling Locations

Stream delineations were completed per the Appendix A methodology in PADEP Technical Guidance Document (TGD) 563-2000-655 . Delineations of respective stream segments (i.e., Diverse, Variable, and First Use) were completed in March 2007. Following Appendix A classifications, long-term Appendix B biological stream monitoring points were established on biologically diverse stream segments. Representative fish sampling locations were identified that overlapped Appendix B stream monitoring points. The sampling locations are identified as GAR_1, HOG_1, HOG_2, HOU_1, MCR_2, MCR_3 and GRR_1 (Figure 6-3). No fish sampling was conducted within the open water areas of Wetland H or Wetland I as part of this analysis.

6.2.4.3.2 Fish Sampling Methodology

Fish sampling was conducted in accordance with methodologies in the *Rapid Bioassessment Protocols [RBP] for Use in Streams and Wadeable Rivers: Periphyton, Benthic Macroinvertebrates and Fish (2nd ed.) (EPA 841-B-99-002)* (Barbour, Gerritsen, Snyder, & Stribling, 1999). Initial collection was conducted by Wallace & Pancher, Inc. (WPI) field personnel using an Appalachian Aquatics model AA-24 backpack electrofishing (BPEF) unit with an adjustable output voltage range of 75 to 850 volts DC. A single pass was conducted, encompassing all wadeable habitat types within a one hundred (100) meter sampling reach. The BPEF unit employs a two (2) probe configuration to promote safety and increase sampling efficiency. Habitats sampled using this method included riffles, runs, pools, snags and submerged macrophytes.

Each sampling reach began at a riffle, snag, or other physical barrier suitable to isolate the upstream section to be sampled. While sweeping the anode and cathode probes from bank to bank, sampling proceeded upstream. Netters followed the electrofishers to collect stunned fish greater than twenty millimeters (> 20mm) total length and stored the fish in a five (5) gallon bucket. Sampling terminated at a natural physical barrier (e.g., riffle, snag, etc.). If a natural physical barrier was not present within the prescribed sampling reach, the use of a block net was employed.

Specimens were identified in the field immediately after sampling using standard keys. Each organism was identified to species level, analyzed for condition, and released in accordance with the RBP methodology. Organisms that were unidentifiable in the field were stored in 10% buffered formalin and later identified in the laboratory.

6.2.4.3.3 Description of Fish Survey Metrics

This section provides a summary of the RBP metrics that were utilized to assess the fish yields from the electrofishing activities.

Total Number of Fish Species. This number generally decreases with increased ecological disturbance and pollutant sources. The number of species is positively correlated by drainage area in warm water stream systems, but not at large river sites (Karr et al. 1986, Ohio EPA, 1987).

Dominant Species. Ecological dominance is the degree to which a species out competes similar species in a given environment. A fish community dominated by one species indicates an environmental factor permitting the dominance of that species. This information paired with the life characteristics of the dominant species allows conclusions to be drawn about the surrounding environment.

Total Number of the Dominant Species. This number enumerates the degree of ecological dominance.

Number of Intolerant Species. This metric distinguishes the relative quality of sites using species that are intolerant of various chemical and physical perturbations. Intolerant species are typically the first species to disappear following a disturbance.

Number of Individuals in Sample. This metric represents the density of individuals, evaluates population abundance, and varies with region, available habitat, water quality and watershed position. It is expressed as catch per unit effort (CPUE). CPUE is most effective in assessing the electrofishing methodology because sample effort within a sample site can vary from year to year or season to season due to changes in flow rate and detritus input or obstruction in the sample area. Generally, sites with lower integrity support fewer individuals however nutrient enrichment tends to increase the number of individuals. Unusually low numbers are indicative of disturbance, making this metric most useful at the low end of the biological integrity scale.

Shannon-Wiener Diversity Index. The Shannon-Wiener Diversity Index (SWDI) is a measure of diversity that will provide the likelihood that the next individual will be the same species as the previous sample. The SWDI values range from 0 to ~ 4.5. A value near 0 would indicate that every species in the sample is the same, and therefore has a low diversity. Conversely, a high value would indicate a high diversity because individuals are distributed evenly between many species.

6.2.4.3.4 Summary of 2010 Fish Survey Results

Results of the 2010 fish survey for mainstem perennial streams within the Foundation Mine project area are provided in Table 6-1 and 6-2 below.

Table 6-1. Foundation Mine 2010 Fish Survey Results

Watershed	Garner Run		Hoge Run				House Run		McCourtney Run				Grinage Run		Species Designation and Trophic Guild	
2010 Foundation Fish Community Details	**GAR 1**		**HOG 1**		**HOG 2**		**HOU 1**		**MCR 3**		**MCR 2**		**GRR 1**		**Tolerance Designation (relevant to non-specific stressors)**	**Trophic Guilds**
	# organisms	Rel. Abundance	# organisms	Rel. Abundance	# organisms	Rel. Abundance	# organisms	Rel. Abundance	# organisms	Rel. Abundance	# organisms	Rel. Abundance	# organisms	Rel. Abundance		
White Sucker (*Catostomus commersoni*)	0	0%	**2**	**1%**	0	0%	0	0%	**36**	**16 %**	**11**	**1%**	**0**	**0%**	Tolerant	Omnivore
Northern Hog Sucker (*Hypentelium nigricans*)	0	0%	0	0%	0	0%	0	0%	**8**	**4%**	**3**	<1%	0	0%	Intolerant	Insectivore
Golden Redhorse (*Moxostoma erythrumrum*)	0	0%	0	0%	0	0%	0	0%	**2**	**1%**	**6**	**1%**	0	0%	Intolerant	Insectivore
Black Redhorse (*Moxostoma duquesnei*)	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	Intolerant	Insectivore
Creek Chub (*Semotilus atromaculatus*)	**86**	**21%**	**62**	**20 %**	**53**	**71%**	**50**	**49%**	**17**	**8%**	**111**	**11%**	**29**	**26%**	Tolerant	Generalist Feeders
Central Stoneroller Minnow (*Campostoma anomalum*)	**169**	**42%**	**7**	**2%**	**1**	**1%**	**5**	**5%**	**14**	**6%**	**142**	**14%**	**8**	**7%**	Intermediate	Herbivore
Bluntnose Minnow (*Pimephales notatus*)	**8**	**2%**	**28**	**9%**	**1**	**1%**	**8**	**8%**	**50**	**22 %**	**386**	**38%**	**0**	**0%**	Tolerant	Omnivore
Silverjaw Minnow (*Ericymba buccata*)	**5**	**1%**	0	0%	0	0%	0	0%	**7**	**3%**	**61**	**6%**	0	0%	Intermediate	Insectivore
Common Shiner (*Luxilus cornutus*)	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	Intermediate	Insectivore
Striped Shiner (*Luxilus chrysocephalus*)	**1**	**0%**	0	0%	0	0%	0	0%	**22**	**10 %**	**72**	**7%**	0%	0%	Intermediate	Insectivore
Blacknose Dace (*Rhinichthys atratulus*)	**21**	**5%**	**100**	**32 %**	**15**	**20%**	**23**	**22%**	0	0%	**49**	**5%**	**17**	**15%**	Tolerant	Generalist Feeders
Sand Shiner (*Notropis stramineus*)	0	0%	0	0%	0	0%	0	0%	0	0%	**26**	**3%**	0	0%	Intermediate	Insectivore
Smallmouth Bass (*Micropterus dolomieu*)	0	0%	0	0%	0	0%	0	0%	**2**	**1%**	**8**	**1%**	0	0%	Intermediate	Piscivore
Rock Bass (*Ambloplites rupestris*)	**5**	**1%**	0	0%	0	0%	0	0%	**2**	**1%**	**2**	<1%	0	0%	Intermediate	Piscivore
Yellow Bullhead (Ameiurus *natalis*)	0	0%	0	0%	0	0%	0	0%	0	0%	**1**	<1%	0	0%	Intermediate	Insectivore
Johnny Darter (*Etheostoma nigrum*)	**9**	**2%**	**39**	**13 %**	**1**	**1%**	**8**	**8%**	**8**	**4%**	**30**	**3%**	**0**	**0%**	Intermediate	Insectivore
Rainbow Darter (*Etheostoma caeruleum*)	**32**	**8%**	**33**	**11 %**	0	0%	0	0%	**8**	**4%**	**62**	**6%**	0	0%	Intermediate	Insectivore
Fantail Darter (*Ethestoma flabellare*)	**63**	**15%**	**39**	**13 %**	**4**	**5%**	**9**	**9%**	**47**	**21 %**	**44**	**4%**	**21**	**19%**	Intermediate	Insectivore
Greenside Darter (*Etheostoma blennioides*)	**8**	**2%**	0	0%	0	0%	0	0%	**1**	**0%**	**15**	**1%**	0	0%	Intermediate	Insectivore
Total Catch	**407**		**310**		**75**		**103**		**224**		**1029**		**75**			
CPUE (Total # Fish / Hr.)	**1112**		**777**		**422**		**307**		**558**		**1510**		**204**			

Table 6-2. Foundation Mine Fish Survey Sampling Metrics

2010 Fish Data							
Major Watershed	**Garner Run**	**Hoge Run**		**House Run**	**McCourtney Run**		**Grinage Run**
Sample Site	**GAR 1**	**HOG 1**	**HOG 2**	**HOU 1**	**MCR 3**	**MCR 2**	**GRR 1**
Sampling Gear Used	BPEF	BPEF	BPEF	BPEF	BPEF	BPEF	BPEF
Number of Species	11	8	6	6	14	17	4
Dominant Species	Central Stoneroller Minnow	Blacknose Dace	Creek Chub	Creek Chub	Bluntnose Minnow	Bluntnose Minnow	Creek Chub
Total Number of Dominant Species	169	100	53	50	50	386	29
Number of Intolerant Species	0	0	0	0	2	2	0
CPUE	1112	777	423	307	559	1510	204
SWDI	1.69	1.78	0.89	1.44	2.17	2.09	1.29

Among the seven (7) fish sampling points in the project area, the highest species diversity (17) samples were collected from McCourtney Run point MCR 2 while the least species diversity sample (4) was collected from GRR 1. Of the nineteen (19) different fish species collected, only three (3) species of game fish were observed within the samples taken in 2010 including smallmouth bass (*Micropterus dolomieu*), rock bass (*Ambloplites rupestris*) and yellow bullhead (*Ameiurus natalis*). The fish were observed in relatively low numbers (< 10 total individuals collected) at the Garner and McCourtney Run sampling points. The CPUEs for the sampled sites ranged from 204 to 1510 while the SWDI values ranged from 0.89 to a maximum of 2.17. Overall the streams do not support large numbers or a diverse population of pollution intolerant fish species. The dominance of pollution tolerant fish species and observed presence of mostly generalist and omnivorous feeder species found across all of the fish sampling suggests that the streams are impaired. Summaries of each sample are provided in the paragraphs below:

Garner Run (GAR 1). Sampling of location GAR 1 produced a total of eleven (11) species with the central stoneroller minnow (*Campostoma anomalum*) being the dominant species collected. The central stoneroller (*Campostoma anomalum*) is characterized as a herbivore and an intermediate pollution tolerant species (USEPA 1999). The SWDI of GAR 1 was 1.69 and the CPUE was 1112 fish per hour. In 2010 no intolerant species were collected at the GAR 1 sample site.

Grinage Run (GRR 1). The GRR 3 sample produced a total of four (4) species of which the creek chub (*Semotilus atromaculatus*) was dominant species collected. The SWDI of GRR 1 was 1.29. The CPUE at GRR 1 was 204 fish per hour. No intolerant species were collected at the GRR 1 sampling site during 2010.

Hoge Run (HOG 1). HOG 1 produced a total of eight (8) species with the blacknose dace (*Rhinichthys atratulus*) being the dominant species collected. The blacknose dace ((*Rhinichthys atratulus*) is characterized as a generalist feeder and is a pollution tolerant species (USEPA 1999). The SWDI of HOG 1 was 1.78. The CPUE at HOG 1 was 777 fish per hour. No intolerant species were collected at the HOG 1 sampling site in the 2010 sample.

Hoge Run (HOG 2). HOG 2 produced a total of six (6) species with the creek chub (*Semotilus atromaculatus*) being the dominant species collected. The creek chub (*Semotilus atromaculatus*) is characterized as a generalist feeder and is a pollution tolerant species (USEPA 1999). The SWDI of HOG 2 was 0.89. The CPUE at HOG 2 was 422 fish per hour. No intolerant species were collected at the HOG 2 sampling site in 2010.

House Run (HOU 1). HOU 1 produced a total of six (6) species with the creek chub (*Semotilus atromaculatus*) being the dominant species collected. The SWDI of HOU 1 was 1.44. The CPUE at HOU 1 averaged 307 fish per hour. There were no intolerant species collected in the HOU 1 sampling site in 2010.

McCourtney Run (MCR 2). MCR 2 produced a total of seventeen (17) species with the bluntnose minnow (*Pimephales notatus*) being the dominant species collected. The bluntnose minnow (*Pimephales notatus*) is characterized as an omnivore and a pollution tolerant species (USEPA 1999). The SWDI of MCR 2 was 2.09.with a CPUE of 1510 fish per hour. In 2010 there were two (2) intolerant species found in the MCR 2 sample, the Northern hog sucker (*Hypentelium nigricans*) (three individuals) and Golden Redhorse (*Moxostoma erythrurum*) (six individuals). The relative abundance of these species was low (< 1%) in comparison to the total number of individuals collected (total of 1,029).

McCourtney Run (MCR 3). MCR 3 produced fourteen (14) species with the bluntnose minnow (*Pimephales notatus*) being the dominant species collected. The SWDI of MCR 3 was 2.17. The CPUE at MCR 3 was 559 fish per hour. In 2010, there were two (2) intolerant species collected MCR 3, the Northern hog sucker (*Hypentelium nigricans*) (eight individuals) and golden redhorse (*Moxostoma erythrurum*) (two individuals). The relative abundance of these species was low (4% and < 1% respectively) in comparison to the total number of individuals collected (total of 224).

South Fork Tenmile Creek (40293 SFTM 2:S). A typical fish assemblage for Southfork Tenmile Creek was collected at a site (40293 SFTM 2:S) approximately four (4) miles downstream of the proposed water intake project area. Seventeen species (17) and 135 individuals, with spotfin shiner (*Cyprinella spiloptera*) being the dominant species were captured. spotfin shiner (*Cyprinella spiloptera*) comprised 20% of the sample with intermediate tolerance, and is an insectivore (USEPA 1999). There were five (5) fish species that are intolerant to nonspecific stressors. Three (3) three of the fish sampled were Predators. CPUE was 230.4 fish per hour, and the SWDI was 2.58.

6.2.4.4 Fishing and Recreational Opportunities

Although possible, fishing and recreational opportunities such as kayaking, hiking, canoeing, and boating within the main stem perennial streams and Wetland H and I within the project area are limited due to the size, limited flow depths (< approximately 1 foot in average flow depth for streams) and narrow widths (<30 feet in wetted width for streams) of the aquatic resources in the project area. The opportunities are further limited by the lack of public access, lack of recreational enhancements (e.g., access ramps, docks, launch points), private property ownership, and the lack of game fish species (e.g., primarily bass and panfish species) that currently exists in the streams in this area. Furthermore, based on a review of the PA Fish and Boat Commission's 2011 Approved Trout Waters and stocking lists (Commonwealth of Pennsylvania, n.d., *Approved Trout Waters,* accessed September 25, 2011, http://fishandboat.com/fishpub/summary/troutwaters.html), none of the streams or project area wetlands are currently stocked with trout or have received recreation related enhancements or provide any recreational opportunities to the public.

6.2.4.5 Impacts to Fish Species

The project is expected to directly impact numerous high gradient perennial, intermittent and ephemeral streams as a result of channel realignments, placement of fill materials and structures within existing channels, culvert extensions, and the deforestation of riparian habitats associated with the development of the project surface facilities. Direct impacts to the perennial streams and the main stem of Garner, Grinage, Hoge, and House Run include the following:

6.2.4.5.1 Garner Run Impacts

Impacts will include the construction of two (2) steel culvert extensions located within unnamed tributaries to Garner Run. Installation of the culverts will impact existing aquatic habitat within the unnamed tributaries that is available for fish species. The loss of stream habitat will be replaced through stream restoration activities as described in Section 7.0 and Appendix F of this document.

6.2.4.5.2 Grinage Run Impacts

Direct impacts to Grinage Run will include the construction of two (2) steel culvert extensions located along the Railroad Siding expansion and facilities. Installation of the culverts will impact aquatic habitat available for fish species that currently inhabit Grinage Run. The loss of stream habitat will be replaced through stream restoration activities as described in Section 7.0 and Appendix F of this document.

6.2.4.5.3 Hoge Run Impacts

Channel Fill. Approximately 6,808 feet of Hoge Run main stem will be filled by the construction of Coal Refuse Disposal Area R-3 and associated sediment basins and surface facilities. Combined soil, rock, and coal refuse materials, exceeding 100' in depth, will be placed within the entire stream valley and the stream bed and available habitat will be permanently impacted. Existing fish populations are anticipated to be displaced downstream as clearing, grubbing, and site grading activities proceed in the upper portions of the watershed. As a result, approximately 1.17 acres of existing aquatic habitat within the main stem channel of Hoge Run will be lost.

Hoge Run Channel Relocation. Approximately 5,731 linear feet of Hoge Run main stem downstream of the proposed CRDA R-3 area will be realigned and reconstructed in an approximately 4,924 linear-foot long, twenty five (25) foot wide channel relocation. In addition, two (2) box culverts totaling 171 linear feet will be installed within the relocated portion of the stream. Existing fish populations are anticipated to be displaced further downstream as clearing, grubbing, and site grading activities proceed in the upper portions of the watershed. As a result, approximately 807 linear feet of the Hoge Run stream channel will be eliminated by the reduced length of the relocated stream and 171 linear feet of stream bottom will be placed into the culverts. However, the channel relocation will be constructed using natural channel design principles. The loss of stream habitat will be replaced through stream restoration activities as described in Section 7.0 and Appendix F of this document.

6.2.4.5.4 House Run Impacts

Direct impacts to House Run will include construction of one (1) concrete box culvert located along the proposed shaft site. Installation of the culvert will temporarily impact aquatic habitat available for fish species that currently inhabit that portion of House Run during construction. However, as stipulated by representatives of PADEP, the steel culvert invert will be depressed 1 foot into the stream bed in order to maintain natural substrate materials within the structure and rock rip rap protection.

6.2.4.5.5 Ephemeral and Intermittent Impacts

The ephemeral and intermittent streams do not provide persistent stream flow or aquatic habitat capable of supporting fish species, however, these streams do provide base flow, sources of fine sediments, organic matter, and short-term and seasonal habitat for various macroinvertebrate and terrestrial organism communities that contribute to the stream flow, substrate composition, and the nutrient cycle of the larger order perennial receiving streams. Given the location of stream impacts within the lower portion of the main stem stream watersheds, it is expected that the loss of these resources will have minimal impact to fish species. Because of the steep topography present within the project area, these streams do not provide sufficient continuous flow and habitat for utilization by many fish species, except on a limited seasonal basis.

6.2.4.5.6 Temporary Impacts

In addition to permanent impacts related to construction of the surface facilities, culvert extensions, new culvert construction, and channel relocations, numerous sediment and stormwater retention basins will be constructed alongside existing perennial streams. Temporary impacts to the streams resulting from earth disturbance including minor sediment deposition, temperature increases, and increased turbidity are expected to occur during the construction phase.

Surface runoff from disturbed areas within the active construction zones during the construction phase and runoff from disturbed surface facility areas throughout the operational phase will be collected and diverted to the basins for storm water retention and sediment removal. After treatment, runoff will be discharged as outlined in Section 6.6 – Surface Water Quality/Chemistry. Any discharge to area streams will be in accordance with NPDES discharge requirements established by PADEP. Effluent limits for the stormwater and sediment facilities will not permit degradation of the aquatic use of the receiving streams.

6.2.4.5.7 Minimization of Impacts to Fish

Construction activities within the project area streams are expected to occur during periods of low flow in order to minimize stream disturbances, sedimentation, and temporary effects to water quality. These effects include but may not be limited to increased turbidity and water temperatures, sediment deposition within the stream channel, and the removal or burying of natural substrate materials with introduced rock and soil materials. As in-stream construction activities advance, existing fish and macroinvertebrate communities are expected to temporarily relocate upstream or downstream of the affected areas. Following stream work, fish and macroinvertebrates are expected to recolonize within restored and reconstructed stream habitats.

Temporary impacts to the aquatic habitats will be minimized through the development and implementation of approved erosion and sediment control plans. Implementation of appropriate Best Management Practices (BMPs) such as sediment traps/basins, silt fencing, diversion channels, temporary seeding and mulching, etc., designed specifically for each construction area within the surface facilities will address temporary impacts to aquatic resources such as accelerated soil erosion and sediment deposition. No further mitigation for these temporary impacts is anticipated.

Mitigation for permanent impacts to project area streams are contained within the proposed Conceptual Compensatory Mitigation Plan provided as Section 7.0 and Appendix F of the application. The plan provides restoration of existing degraded streams and includes the construction of aquatic habitat enhancements and in-stream structures that will offset the anticipated impacts. In addition, the preservation of existing EV headwater streams and intact headwater stream systems within the project vicinity is proposed to provide long-term water quality benefits. Restoration and Preservation areas will be protected in perpetuity through easements and deed restrictions.

6.2.5 Terrestrial Habitats and Wildlife

As previously stated, the proposed project area encompasses approximately 1,867 acres that exists along the main stem and valley slopes of Garner and McCourtney Run, the lower portions of House Run floodplain and valley slopes, nearly the entire Hoge Run floodplain and valley slopes, the lower portion of the Grinage Run floodplain and valley slopes, and a relatively small portion of the main stem South Fork Tenmile Creek watershed.

The project area contains a variety of land cover types that currently support native floral and faunal species that are common to the southwest region of Pennsylvania and Greene County. Mature and successional mixed deciduous forestland is the predominant land cover within the project area. Compartments of agricultural land uses comprised of both active and reverting pasturelands, hayfields, and croplands are the second most dominant land use within the project area. In addition to these uses, several existing utility rights of way (e.g., gas transmission and overhead electric power lines) and transportation corridors (e.g., local and state roadways and Norfolk Southern Railroad track) fragment the forested tracts as they cross over and through the project area. The following paragraphs provide a summary of the existing terrestrial habitats and wildlife communities observed within the project area, a description of the anticipated impacts to the resources, and anticipated mitigation for the proposed impacts.

6.2.5.1 Public Parks, Forest Lands, Gamelands and State and Federal Wildlife Refuges

As part of the evaluation of the fish, wildlife and habitats, the applicant conducted reviews of available published literature and mapping, state and federal agency websites and the Greene County Natural Heritage Inventory (Western Pennsylvania Conservancy, 2005) and the Greene County Comprehensive Plan (Greene County Commissioners, 2010), to determine whether specially protected habitat resources exist within or in the vicinity of the project area. These resources include:

- Federal or state forestlands
- Federal, state or local wildlife sanctuaries or preserves
- National, State or local parklands
- State Gamelands

A review of the PA Game Commission public game lands website revealed that no state game lands exist within the project area. However, the review revealed that one state gameland (SGL 179) consisting of approximately 5,600 acres, exists to the southwest of the project area in Jackson Township. This area is managed for both game and non-game species of wildlife and is one of the few gamelands located within Greene County. A review of the PA DCNR website revealed that no state or national parks exist within the project area or vicinity. However, the review revealed that one state park, Ryerson Station State Park, consisting of approximately 1,200 acres, exists approximately 8.5 miles to the northwest of the project area along Bristoria

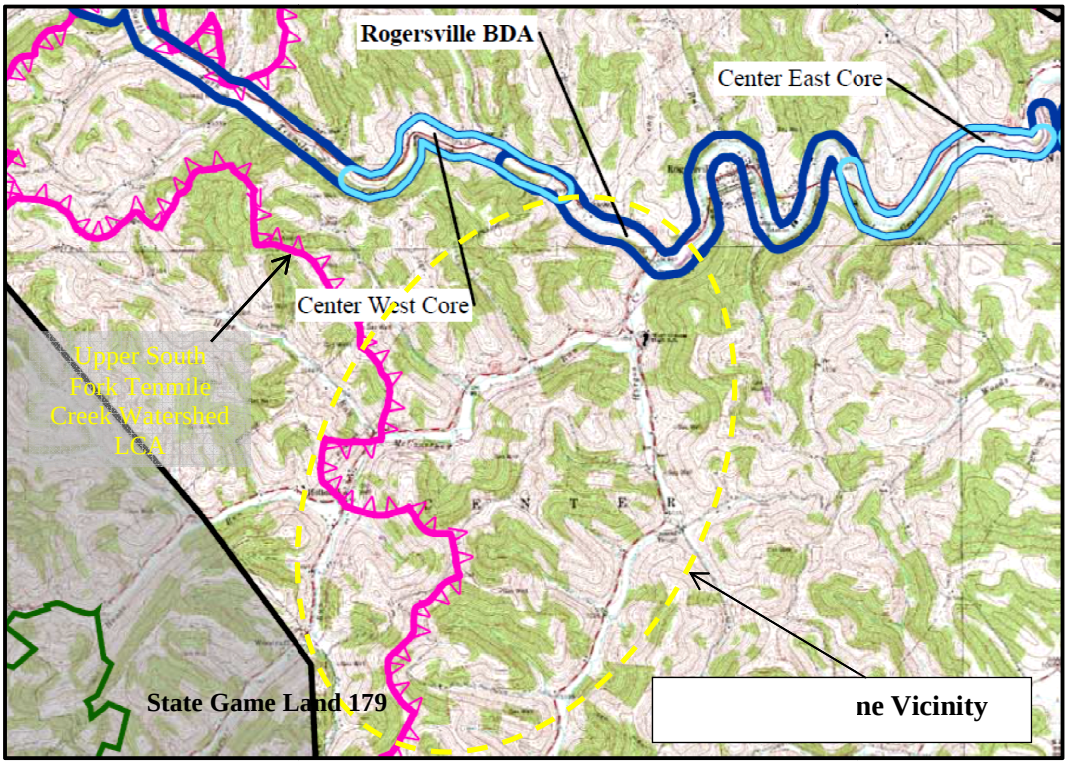
Road in Richhill Township. A review of the National Park Service, and US Fish and Wildlife Service websites revealed that there are no federally designated or recognized national parks, wildlife refuges or sanctuaries located within the project area or vicinity.

Since these resources are not known to exist within the project area, it is expected that the project will have no direct impacts to any of these special protection habitat areas or lands. However, it is expected that local wildlife will be displaced from the project area during the construction of the surface facilities. Displaced wildlife may eventually relocate to similar available habitats provided in the area of SGL 179, as well as other available habitat areas that exist on adjacent privately-owned parcels in the vicinity.

6.2.5.2 Greene County Natural Heritage Inventory

For the purposes of planning conservation efforts, the Greene County Natural Heritage Inventory (Western Pennsylvania Conservancy, 2005) was prepared from a cooperative effort by Western Pennsylvania Conservancy and PA DCNR to provide an overall preliminary assessment of existing natural resources within Greene County. Although the document may be used as a tool to guide land use decisions (e.g., zoning, conservation, development) it is non-statutory or not legally binding, and does not preclude future land uses. A review of the Inventory identified areas within Greene County as Biological Diversity Areas (BDA) and/or Landscape Conservation Areas (LCA).

According to the NHI, the proposed project area is located within the broader, Upper South Fork Tenmile Creek Watershed LCA and would extend into the Rogersville BDA. The inventory further describes the South Fork Tenmile Creek Watershed LCA as "…encompassing the core and supporting habitat for the Rogersville BDA, which supports two populations of an animal species of concern." and includes developed areas along S.R. 0018 and S.R. 0021, but is mainly comprised of farmland and forest."



General location of NHI identified LCA and BDA's in the project vicinity
(Source: Greene County NHI, 2005)

6.2.5.3 State and Federally Listed Threatened and Endangered Species

Information pertaining to threatened, endangered, or species of special concern; and coordination efforts with state and federal resources agencies are contained in Section 6.5 – Threatened and Endangered Species.

6.2.5.4 Description of Existing Land Cover and Terrestrial Habitats

The project area is comprised of a mosaic of forest land, agricultural lands, rural residential, transportation, and utility rights of way. The project area and surrounding environment has been historically influenced by agricultural activities; however, the majority of the acreage is primarily a patchwork of deciduous forested hillslopes, ridges, and bottomlands that also contains dense scrub shrub cover in the understory and along forest margins.

6.2.5.4.1 Existing Forest Lands and Scrub Shrub Habitats

Forestland and associated scrub shrub understory currently occupies approximately 1,477 acres (79%) of the project area. Based on GIS analysis and reconnaissance, no old growth timber stands are known to exist in the project area. Based on review of historical aerial photos

(Pennsylvania State University, http://www.pennpilot.psu.edu/) and the observed presence of relict logging roads, decaying mature tree stumps and signs of recent logging activities, it is apparent that forestland throughout the project area has been timbered throughout various times in the past. As a result, successional tree species such as black cherry (*Prunus serotina*), American beech (*Fagus grandifolia*), sugar maple (*Acer saccharum*), red maple (*Acer rubrum*), shagbark hickory (*Carya ovate*), black walnut (*Juglans nigra*) and a variety of oak species (*Quercus spp.*) are common throughout the project area. Within the floodplain/riparian zones typical tree species included black willow (*Salix nigra*), American sycamore (*Platanus occidentalis*), sugar maple (*Acer saccharum*) and box elder (*Acer negundo*).

Field reconnaissance revealed that as recently as 2010, a portion of the project area within the House Run watershed, estimated at approximately 95 acres (0.051%), was timbered by the prior landowner. This area was subsequently acquired by Foundation Mining, LLC for the development of Coarse Refuse Area 1B. The approximate location and extent of the recently timbered area is illustrated on Figure 6-1.

Upland scrub-shrub understory associated with the forestland and reverting pasture land and field margins contained hawthorn (*Crataegus spp.*), multiflora rose (*Rosa* multiflora)and a variety of maple sp., oak sp., beech and cherry saplings. Scrub-shrub species within the riparian zones and wetland areas included spicebush (*Lindera benzoin*), multiflora rose (*Rosa multiflora*), sapling black willow (*Salix* nigra) and sapling American sycamore (*Platanus occidentalis*).

6.2.5.4.2 Existing Agricultural Land / Grassland

Agricultural and grasslands occupies approximately 275 acres (15%) of the project area. Agricultural land uses within the project area included dairy farming, livestock pasture, hay fields, and row crops (e.g., primarily corn). The farmlands contained herbaceous ground cover comprised of a variety of grasses such as timothy (*Phleum pretense*), bromes (*Bromus spp.*), fescues (*Festuca spp.*), red clover (*Trifolium pretense*), perennial ryegrass (*Lolium perenne*), deer-tongue grass (*Panicum clanestinum*) and a variety of other common grass species. Along the stream floodplains and riparian zones, wingstem (*Verbesina alternifolia*), reed canary grass (*Phalaris arundinacea*), jewelweed (*Impatiens spp.*) and goldenrod (*Solidago spp.*) species tended to be more prevalent, often occurring in expansive monocultures.

Over the past 5-10 years, Alpha Natural Resources (Foundation Mining, LLC) has gradually acquired the majority of the residential and agricultural properties within the project area. As a result, many of the farming operations are no longer in active production and the once heavily utilized and managed pastures, hayfields, and croplands are currently in the process of ecological succession. These areas are reverting to grass rangeland, scrub shrub, and various “old field” herbaceous species such as ragweeds (*Ambrosia spp.*), goldenrods (*Solidago spp.*), blackberry (*Rubus spp.*), raspberry (*Rubus spp.*), greenbriar (*Smilax rotundifolia*), asters (*Aster spp.*), and burdock (*Arctium tomentosa*).

6.2.5.4.3 Rural Residential/Developed Lands/Transportation Corridors

For the purposes of the terrestrial habitat evaluation, all residential, commercial, bare surfaces, transportation (e.g., roads and railroads) and other developed lands are considered to exhibit limited wildlife habitat functions and will be discussed as one classification. The developed land uses encompass approximately 115 acres (6%) of the total project area and exist primarily along the major transportation corridors of SR 0018 and the existing Norfolk Southern Railroad. These corridors parallel one another and run southwest to northeast through the project area.

These areas are comprised of rural commercial and residential buildings, associated outbuildings and structures, manicured lawns, parking facilities, paved road surfaces and driveways, railroad track, access roads, and limestone ballast (e.g., railroad bed materials). These uses preclude wildlife activities and habitation and developed areas serve as transient travel corridors for wildlife as individuals traverse between the adjacent forested and grassland compartments.

6.2.5.5 Summary of Observed Terrestrial Habitats

The available terrestrial wildlife habitat within the project area is common to this region of Greene County and no “unique” or “exceptional” habitat areas were observed or are known to exist within the project area. The existing onsite terrestrial habitat generally provides opportunities for forage, cover, rearing, resting, and nesting activities for a variety of common game and non-game species typical to the area. Areas along and in the vicinity of the existing road corridors, utility rights-of-way, railroad corridors, and residential parcels contain less diverse vegetation and cover types; offering fewer potential food sources and habitats and provide limited opportunities for wildlife uses except in a transient nature.

6.2.5.6 Project Area Wildlife Surveys

In 2010 and 2011, Foundation Mining, LLC conducted numerous bat surveys (i.e., mist netting) in response to the potential presence of the Indiana bat (*Myotis sodalis*), as determined by US Fish and Wildlife Service. No Indiana bats (*Myotis sodalis*) were observed during the surveys.

6.2.5.7 Existing Observed Wildlife

Although no formal wildlife surveys were conducted across the entire project area, common mammal, bird, reptile and amphibian species were observed during field reconnaissance. Based on the field observations, wildlife within the proposed project area is typical of the region. In addition to the observed faunal species, evidence of a number of additional species of wildlife were also noted (e.g., tracks and scat).

6.2.5.7.1 Mammals

Mammals observed within the project area included game species such as white-tailed deer (*Odocoileus virginianus*), woodchucks (*Marmota monax*), red squirrels (*Tamiasciurus hudsonicus*), grey squirrels (*Sciurus carolinensis*), fox squirrels (*Sciurus niger*), and Eastern cottontail rabbits (*Sylvilagus floridanus*). Non-game species observed in the project area included Eastern chipmunks (*Tamias striatus*), meadow voles (*Microtus pennsylvanicus*) and deer mouse (*Peromyscus maniculatus*).

Visible signs such as bedding areas, tracks, feeding areas, and scat of a variety of other common mammals were observed, especially along stream corridors, including beaver (*Castor canadensis*) (e.g., cuttings and dam construction in and around Stream 40644, Wetland H and Wetland I), muskrat (*Ondatra zibethicus*) (e.g., tracks and bank burrows along streams) and Eastern raccoon (*Procyon lotor lotor*) (e.g., tracks and feeding areas along stream banks). Beaver (*Castor canadensis*), muskrats (*Ondatra zibethicus*) and raccoon (*Procyon lotor lotor*) are considered furbearers in the Commonwealth of Pennsylvania and are often trapped for their hides.

6.2.5.7.2 Birds

No formal bird inventories or assessments were conducted within the project area. During field reconnaissance, common game and non-game bird species were observed. Birds observed within the project area included game species such as Canada goose (*Branta Canadensis*), mallard duck (*Anas platyrhynchos*), ruffed grouse (*Bonasa umbellus*), American woodcock (*Scolopax minor*) and wild turkey (*Meleagris gallopavo*). Non-game species including great blue heron (*Ardea herodias*), common raven (*Corvus corax*), turkey vultures (*Cathartes aura*), red-tailed hawks (*Buteo jamaicensis*), American kestrel (*Falco sparverius*), killdeer (Charadrius vociferous), belted kingfisher (Megaceryle alcyon), pileated woodpecker (*Dryocopus pileatus*), blue Jay (*Cyanocitta cristata*), house wren (*Troglodytes aedon*), American robin (*Turdus mirgratorius*), black-capped chickadee (*Poecile antricapilla*), chipping sparrow (*Spizella passerina*), Northern cardinal (*Cardinalis cardinalis*), red-winged Blackbird (*Agelaius phoeniceus*), common grackle (*Quiscalus quiscula*) and mourning dove (*Zanaida asiatica*) were also observed.

6.2.5.7.3 Reptiles and Amphibians

No detailed inventories or formal assessments of reptile or amphibian species were conducted within the project area. During field reconnaissance, several common reptile and amphibian species were observed, primarily along and within the stream margins and riparian corridors. Identified species of reptiles and amphibians included snapping turtle (*Chelydra serpentine*), wood frog (*Rana sylvatica*), red-spotted newt (*Notophthalmus viridescens*), red-backed salamander (*Plethodon cinereus*), Eastern garter snake (*Thamnophis sirtalis sirtalis*), American toad (*Anaxyrus americanus*) and Spring peeper (*Pseudacris crucifer*).

6.2.5.8 Wildlife Related Recreation - Hunting and Trapping

Currently, land owned by Alpha Natural Resources and its subsidiaries, including Foundation Mining, LLC, are enrolled in the Pennsylvania Game Commission Cooperative Landowner Program. As a cooperator, hunting and trapping activities for game species and fur bearers are permitted on parcels owned by Alpha Natural Resources within most areas that do not contain active mining operations or facilities. All hunting activities must be conducted in accordance with the appropriate hunter safety and game laws of the Commonwealth of PA and with prior written permission of Alpha Natural Resources.

6.2.5.9 Impacts to Terrestrial Wildlife

Anticipated impacts to terrestrial habitats and indigenous wildlife was assessed through an analysis of the existing proposed project area land cover versus the proposed limits of project earth disturbance which is comprised of all areas of proposed cuts, fills and surface grading for surface facilities, access roads, erosion and sediment controls and all other anticipated earth disturbance associated with development of the Foundation Mine surface facilities. Construction of these facilities will require the clearing and grubbing of existing vegetation and elimination of existing habitats for the establishment of new designed grades for the mine facilities.

Through this analysis, it was determined that development of the Foundation Mine is anticipated to result in approximately 950 acres of earth disturbance within the nearly 1,867 acres contained within the project area which is roughly half of the total acreage. Of the 950 disturbed acres, there would be a temporal loss of approximately 723 acres of existing forestland and associated scrub shrub habitat within the understory and forest margins, 146 acres of reverting grassland/rangeland/pasture habitat and 80 acres of existing developed lands (existing residential, commercial and transportation corridors) located within the proposed limits of earth disturbance.

It is expected that full development of the Foundation Mine surface facilities will be a phased operation and will take several years to complete. Following construction, the mine will continuously operate for the 20-year mine life presently anticipated. During the construction phase, the existing faunal communities that inhabit these areas are expected to be displaced over a period of 24 months as site preparations and clearing and grubbing operations for the phased construction of surface facilities commence and advance through the project area. During that timeframe, the majority of the terrestrial wildlife will gradually be displaced to the surrounding available forested, scrub shrub and rangeland habitats which exist in the surrounding areas in this region of Greene County. It is expected that mammals, birds, reptiles, amphibians and insects displaced by the proposed project will readily relocate to similar, available, adjacent terrestrial and aquatic habitats that currently surround the project area including SGL 179.

The impacts to terrestrial habitats in the SFTC LCA would involve the placement of a waterline along the north side of the existing road right of ways of S.R. 0018. The water line is expected to extend from the proposed water impoundment area within the Foundation Mine surface

facilities along SR. 0018 to the intersection with SR. 0021 along SFTC below the confluence with Hargus Creek. Impacts to the Rogersville BDA would involve construction of the associated flow collection weir, water intake sump, and pump house, which will extract flow from the SFTC and convey it via the pipeline to a freshwater impoundment located in the vicinity of House Run. The proposed location of this facility is within the forested stream margin along the forested stream margin along the south side of the S.R. 0021 corridor.

6.2.5.10 Mitigation of Impacts to Terrestrial Wildlife

In accordance with the rules and regulations promulgated under the Surface Mining Control and Reclamation Act of 1977 (SMCRA) surface disturbances resulting from development of the mining operations and surface facilities will be restored upon completion of mining activities and the closure of the mine workings. During the construction phase, Foundation Mining, LLC will be required to implement Best Management Practices for erosion and sediment controls. In addition, disturbed areas such as cut and fill slopes will be rapidly revegetated with native grass and legume species that will provide a variety of food sources and grassland habitats. These temporary habitats will be recolonized and utilized by various mammal, bird, reptile, amphibian and insect species once construction activities have been completed.

Once mining operations have ceased, surface facilities other than the rail spur embankment and coal refuse disposal areas will be razed and the debris removed. Accumulated coal fines and residue in the sediment/treatment ponds will be removed and incorporated into the coal refuse disposal areas, earthen embankment slopes will be graded to replicate approximate pre-mining contours, and stockpiled topsoil will be redistributed over the surface. Coal refuse disposal areas will be provided with a low-permeability, vegetated, cap. Once restoration grading is completed, the entire area will be vegetated with appropriate native herbaceous, shrub and tree species to provide replacement vegetative cover similar or of higher quality and diversity than the existing habitats. Species selection may include but not be limited to the following:

Reclamation Trees Species:
- American Sycamore (*Platanus occidentalis*)
- Red Oak (*Quercus rubra*)
- Black Cherry (*Prunus serotina*)
- Red Maple (*Acer rubrum*)

Other native tree and shrub species that may be incorporated include:

Lowland/Riparian Trees:
- Black Willow (Salix nigra)
- Pin Oak (Quercus
- Black Gum (Nyssa sylvatica)
- Sugar Maple (Acer Saccharum)

Upland Trees:
- Shellbark Hickory (Carya lacinosa)

American Beech (Fagus grandifolia)

Lowland/Riparian Shrubs:

Highbush Blueberry (Vaccinium corymbosum)
Spicebush (Lindera benzoin)
Buttonbush Cephalanthus occidentalis)
Winterberry (Illex verticillata)
Silky and Red Osier Dogwood (Cornus amomum/Cornus sericea)

Upland Shrubs:

Witchhazel (Hamamelis Virginiana)
American Hawthorne (Crataegus spp)

These species of trees and shrubs would not only provide resting areas, cover and breeding habitats for a wide variety of mammals, birds, reptiles and insects, they also contribute food sources and provide opportunities for foraging, nesting and brood rearing activities once vegetation has become established.

6.3 STREAMS AND AQUATIC FUNCTIONS

The Foundation Mine project area (project area) is located in the Allegheny Mountain Section of the Appalachian Plateau Physiographic Province of Pennsylvania, which is characterized by narrow high ridges and corresponding narrow valleys. The project area encompasses approximately 1,900 acres located in the west-central portion of Greene County, and spans across portions of southwestern Center and northeastern Jackson Townships. Elevations throughout the project area range from 1,000 to 1,580 feet above mean sea level. Typical of the region, the project area is dissected by several third and fourth-order, named streams that receive flows from first and second order headwater tributaries. All of the stream systems exhibit a dendritic (i.e., branching) drainage pattern and, aside from the third and fourth-order systems, are classified as moderate to high gradient streams.

Portions of 7 major sub-watersheds (Grinage Run [40647], Garner Run [40643], House Run [40635], Hoge Run [40632], Hargus Creek [40627], McCourtney Run [40628], and South Fork Tenmile Creek [40293]) exist within the project area. The watersheds are all part of the Monongahela River drainage. Grinage Run is a tributary to Garner Run. The confluence of Garner Run and House Run form McCourtney Run, and Hoge Run is a tributary to McCourtney Run. McCourtney Run confluences with Hargus Creek, which is a tributary to South Fork Tenmile Creek. South Fork Tenmile Creek drains eastward to the confluence with Tenmile Creek (a portion of which is considered a traditionally navigable waterway [TNW]) near Clarksville, PA. Tenmile Creek then confluences with the Monongahela River, a TNW, near the town of Millsboro, PA.

Within the project area, the upper South Fork Tenmile Creek drainage maintains a 25 PA Code Chapter 93 water quality designation of High Quality Warm Water Fishery (HQ-WWF). Chapter 93 defines water quality and life use attainability standards. Also defined within Chapter 93 are the standards and requirements for an Exceptional Value (EV) designation.

Portions of 3 separate stream channels that maintain an EV designation pass through the project area, and activities are proposed in watersheds adjacent to 2 other known EV stream channels.

6.3.1 Existing Stream Resources

Jurisdictional field views with PADEP and the USACE extended over a period of 6 days, May 10-13th, 24th, 31st, and June 1st. Refer to Appendix A for a list of attendees. A description of each aquatic resource is summarized in Tables 6-3 through 6-42 which are included under Section 6.3.2 – Stream Investigation Results. Figures 6-2a through 6-2d illustrate the project area existing streams. Figure 6-3 illustrates the location of biological sampling locations within the project area. Figure 6-4 details the location of delineated wetlands within the project area.

6.3.1.1 Stream Classification

Ephemeral, intermittent, and perennial streams were classified utilizing the following definitions as set forth in 25 PA Code Chapter 89.5:

> ***Ephemeral stream****—a water conveyance which lacks substrates associated with flowing waters and flows only in direct response to precipitation in the immediate watershed or in response to melting snowpack and which is always above the local water table.*
>
> ***Intermittent stream****—a body of water flowing in a channel or bed composed primarily of substrates associated with flowing water which, during periods of the year, is below the local water table and obtains its flow from both surface runoff and groundwater discharges.*
>
> ***Perennial stream****—A body of water flowing in a channel or bed composed primarily of substrates associated with flowing waters and is capable, in the absence of pollution or other manmade stream disturbances, of supporting a benthic macroinvertebrate community which is composed of two or more recognizable taxonomic groups of organisms which are large enough to be seen by the unaided eye and can be retained by a United States Standard No. 30 sieve (28 mesh per inch, 0.595 millimeter openings) and live at least part of their life cycles within or upon available substrates in a body of water or water transport system.*

6.3.1.2 Macroinvertebrate Sampling

Macroinvertebrate sampling was conducted at various points throughout the project area. Two (2) sampling methodologies, PADEP's Technical Guidance Document (TGD) 563-2000-655: *Surface Water Protection – Underground Bituminous Coal Mining Operations* Appendix B and *Rapid Bioassessment Protocols for Use in Streams and Wadeable Rivers: Periphyton, Benthic Macroinvertebrates and Fish (2nd ed.) (EPA 841-B-99-002)* (Barbour, Gerritsen, Snyder, & Stribling, 1999)(RBP), were utilized. A description of each methodology is provided below.

6.3.1.2.1 PADEP TGD 563-2000-655 Appendix B Sampling Protocol

At each Appendix B sample location, a D-frame dip net equipped with a five hundred (500) micron mesh was used to collect ten (10) sub-samples, representing habitats within each one hundred (100) meter sampling reach. Representative habitats included cobble/gravel substrate, snags, course particulate organic matter (CPOM), submerged aquatic habitat (SAV), and sand/fine sediment. Each sample consisted of two (2) 30-inch long sweeps with the net. If the total number of samples was not divisible by the number of habitats present, the remaining samples were taken among the most representative habitat types within the sample area.

All rocks and large stones collected in the D-frame dip net were scraped to remove macroinvertabrates. Contents of the sample net were emptied into 2-liter largemouth plastic Nalgene bottles and preserved in (90%) Isopropyl alcohol.

In the laboratory, the contents of each sample bottle were decanted of the isopropyl alcohol and rinsed with cold water in a 500 micron sieve bucket. All materials from the sample were placed in an 8” x 14” white pan marked with 2” x 2” grids. An illuminated magnifying lens was used to select macroinvertebrates from a minimum of 4 randomly chosen grids. If sampling of the 4 random grids did not produce a subsample of 200 macroinvertebrates (+/-20%), additional grids were randomly chosen until a 200 macroinvertebrate subsample was obtained. If the required 200 organism sub-sample size was not obtained, the entire sample was analyzed. The contents of each subsample were examined under a stereoscopic microscope (140x) for identification and enumeration to the lowest taxonomic level achievable by biologists in the field. Identification was determined utilizing the following references: Merrit and Cummins (2008), Peckarsky (1990), Stewart and Stark (1993), Pennak (1989), Gelhaus (2002), Johannsen and Thomsen (1970), Wiggins (1977), Voshell, Jr. (2005), and Edmunds, Jensen, and Berner (1976). The organisms were then archived in a 30ml Nalgene bottle containing 70% isopropyl alcohol and labeled for permanent storage.

Appendix B sampling were conducted over 2 rounds (2010 Round 1, and 2010 Round 2) at the following 13 sites: GAR1, GAR 3, GAR 7, HOG 1, HOG 2, HOG 3, HOU 1, HOU 2, MCR 1, MCR 2, MCR 3, MCR 4, and GRR 3. Data from these sample events are provided below. (Figure 6-3 and Appendix A)

6.3.1.2.2 Rapid Bioassessment Protocol (RBP) Methodology

Benthic macroinvertebrate samples were collected, identified, and analyzed according to methods prescribed in the U.S. Environmental Protection Agency’s *Rapid Bioassessment Protocols for Use in Wadeable Streams and Rivers* (Barbour et. al. 1999)

Standard RBP samples were collected using a D-frame dip net and 68 ounce plastic bottles. 20 kicks or jabs are conducted in all available habitats. Sampling focused on 5 habitat types (cobble/gravel substrate, snags, course particulate organic matter (CPOM), submerged aquatic

habitat (SAV), and sand/fine sediment). When all 5 habitats were present 4 kicks/jabs were taken from each habitat. If 1 or more of the habitats were absent, additional kicks were divided between the existing habitats beginning with the most dominant.

All rocks and large stones within the kick-net were turned over and gently rubbed with a soft brush to dislodge any organisms or pupae cases that may have been clinging to the surface. Any algae and insect cases found were scraped and washed into the net.

The contents of the sample were washed in a U.S. Standard No. 30 sieve and placed in labeled field sample collection jars. The contents were preserved with (95%) ethanol. All portions of the sample were carefully examined and organisms picked from the debris in the laboratory. The picked organisms were transferred to a specimen vial and preserved with (70%) ethanol.

The contents of the vials were examined under a stereoscopic microscope (140x) for identification and enumeration to the lowest taxonomic level practically achievable by experienced biologists practicing in the field. Identification was assisted by the following references: Peckarsky (1990), Merrit and Cummins (1996), Stewart and Stark (1993), and Pennak (1989).

RBP sampling has been conducted at four (4) sites within the proposed Water Intake area. Sites 40293:SFTM1:S; 40293:SFTM2:S; 40293:SFTM3:S and 40627:HAR1:S. Data from these sampling events are provided in each watershed sub section with summary tables detailing physiochemical conditions as well as sampling results. Please refer to Figure 6-3 (Aquatic Sampling Locations Map) for sample site locations.

6.3.1.3 Physiochemical and Habitat Data

Field physiochemical and habitat data were collected at all sampling sites (Appendix A).

In-situ measurements of temperature, dissolved oxygen, conductance, and pH were collected at each sampling station. Measurements were obtained using a YSI 550A Dissolved Oxygen/ Temperature meter and an Oakton pH/Conductivity meter.
Physical habitat characteristics were recorded at each PADEP TGD 563-2000-655 *Surface Water Protection – Underground Bituminous Coal Mining Operations* Appendix B macroinvertebrate (PA Appendix B) and modified RBP sampling station. The physical habitat parameters included:

(1) Visual appearance of water and sediment quality;
(2) Water depths at each station;
(3) Stream channel width;
(4) Estimated stream velocity;
(5) Substrate composition (the proportion of cobble, gravel, sand and silt substrate)
(6) Degree of canopy cover over the sample area, and;
(7) Description of vegetation.

The data were recorded on physical characterization/water quality field data sheets. Stream habitat was also assessed using habitat assessment data sheets. The USEPA classifies the relative value of habitat according to numerical scores as follows: (1) optimum (100-76%); (2) sub-optimal (75-51%); (3) marginal (50-26%); and (4) poor (25-0%). (Appendix A).

6.3.2 Stream Investigation Results

6.3.2.1 Garner Run (40643) Watershed Overview

Garner Run (40643), a 3,872 acre watershed, flows from southwest to northeast along Golden Oaks Road (SR 0018) until its confluence with House Run (40635). Garner Run and House Run (40635) confluence to form McCourtney Run (40628). Elevations within the watershed range from approximately 1,000 feet to 1,540 feet. The watershed is predominantly forested (88%) with agriculture as the second most prevalent land use (9%) (e.g., livestock pastures and hayfields). Public roads, railroads, commercial facilities and other development make up (92%) of the remaining land use. Within the project area, land use consists of (86%) forested habitat and (7%) agricultural use. Land development comprises (7%) of the project area, while private driveways and residences made up (1%) the remaining land cover. Forest species included upland hardwoods such as white oak (*Quercus alba*), red oak (*Quercus rubrum*) and black cherry (*Prunus serotina*); as well as understory species, such as box elder (*Acer negundo*), spicebush (*Lindera benzoin*) and crabapple (*Malus Sp*.).

According to 25 PA Code Chapter 93, Garner Run and its tributaries have a designated use of High-Quality Warm Water Fisheries (HQ-WWF).

A total of 32,380 linear feet of the Garner Run watershed stream channels are contained within the project area. Sub watersheds within the project area include perennial, intermittent and ephemeral segments of: 40644 (3,351 linear feet), UNT 40645 (6,030 linear feet), 40646 (6,556 linear feet), and 40649 (12,480 linear feet). Tributaries to Garner Run 40643 total 3,963 linear feet (Table 6-3)

Table 6-3. Sub-watershed Breakdown in Total linear Feet by Classification

Reach Name	Inside Project Boundary	Classification Within Project Boundary			Outside Project Boundary	Grand Total
		Ephemeral	Intermittent	Perennial		
40643	3,963	**1,430**	**828**	**1,705**	**26,781**	**30,744**
40644	3,351	**472**	**1,088**	**1,791**	**0**	**3,351**
40645	6,030	**3,212**	**451**	**2,367**	**211**	**6,241**
40646	6,556	**2,017**	**2,414**	**2,125**	**1,360**	**7,916**
40649	12,480	**6,089**	**1,455**	**4,936**	**287**	**12,767**
Total	**32,380**	**13,220**	**6,236**	**12,924**	**28,639**	**61,019**

6.3.2.1.1 Garner Run Sub-Watershed: 40643 Tributaries

Ephemeral Stream Segments. Eleven ephemeral stream segments totaling 1,430 linear feet are located within the project area boundary. These segments ranged from 9 to 338 feet in length and averaged 130 linear feet. The ephemeral channels of 40643 B, 40643 B1, and 40643 B2 exist in a headwater region where groundwater discharge and overland flow originate in steeply sloping topography. Tree species in this area include: white oak (*Quercus alba*), red oak (*Quercus rubra*), sugar maple (*Acer saccharum*), red maple (*Acer rubrum*), and American elm (*Ulmus americana*).

The remaining ephemeral channels are a result of the Norfolk and Southern (NS) railroad grade fill (Table 6-4 and Figures 6-2a & 6-2c.). Alterations to drainage patterns resulting from the buildup of fill material to facilitate railroad construction have created channels that convey runoff from the man-made slope. These channels are high gradient and flow perpendicular to Garner Run 40643. Common vegetative cover in these areas includes multiflora rose (*Rosa multiflora*), blackberry (*Rubus sp.*) and tree of heaven (*Ailanthus altissima*). Substrates consist of railroad ballast and fill material. The majority of these channels flow through culverts and are eroded. Lacking stable substrate, and sustainable stream flow, these ephemeral channels provide limited habitat to aquatic organisms. Functions provided included: sources of fine sediment transport and organic nutrient conveyance to higher order receiving streams downslope.

Table 6-4. Garner Run (40643) & Associated Tributaries - Lengths in L.F. by Classification

Reach Name	Inside Project Boundary	Classification Within Project			Outside Project Boundary	Grand Total
		Ephemeral	Intermittent	Perennial		
40643	1,267	0	0	1,267	23,911	25,178
40643-AA	0	0	0	0	88	88
40643-B	997	338	221	438	205	1,202
40643-B1	110	110	0	0	0	110
40643-B2	347	208	139	0	0	347
40643-BB	85	0	85	0	100	185
40643-C	0	0	0	0	21	21
40643-CC	65	0	65	0	133	198
40643-E	444	234	210	0	466	910
40643-G	252	252	0	0	64	316
40643-J	31	0	31	0	163	194
40643-O	177	177	0	0	118	295
40643-P	27	27	0	0	109	136
40643-Q	18	18	0	0	186	204
40643-R	0	0	0	0	126	126
40643-S	0	0	0	0	117	117
40643-T	0	0	0	0	144	144
40643-U	28	28	0	0	186	214
40643-V	29	29	0	0	193	222
40643-W	0	0	0	0	85	85
40643-X	9	9	0	0	96	105
40643-Y	77	0	77	0	176	253
40643-Z	0	0	0	0	94	94
Total	3,963	1,430	828	1,705	26,781	30,744

Intermittent Stream Segments. Seven intermittent stream segments totaling 828 linear feet exist within the project area. Refer to (Table 6-4 and Figures 6-2a & 6-2c). These segments ranged from 31 to 221 linear feet in length. The intermittent channels of 40643-B, and 40643-B2 were formed where natural drainage patterns collect within steeply sloping hillsides. Median substrate sizes were increased from those within the ephemeral channels due to more consistent channel flow and high peak storm flow, but epifaunal substrate was poor to marginal due to a migratory bed load. Bank stability was compromised in this area and cobble and gravel substrates were laden with the fine sediments deposited by lateral scour. Tree species included: white oak (*Quercus alba*), red oak (*Quercus rubra*), sugar maple (*Acer saccharum*), red maple (*Acer rubrum*), and American elm (*Ulmus americana*).

Alterations to drainage patterns, resulting from construction of the NS railroad embankment, had created channels that convey groundwater discharge from the man-made slope to Garner Run. These channels are high gradient and flow perpendicular to Garner Run. The channels present on the NS railroad embankment predominantly dissipate into the railroad fill area and do not confluence with the main stem. Vegetative cover in these areas included multiflora rose (*Rosa multiflora*), blackberry (*Rubus sp.)* and tree of heaven (*Ailanthus altissima*). Substrates consist of railroad ballast and eroded fill material from the adjacent NS railroad embankment.

Perennial Stream Segments. Within the project area, Garner Run flowed for 1,267 linear feet before its confluence with House Run (40635) as indicated on (Table 6-4 and Figures 6-2a & 6-2c). The mainstem of Garner Run flowed west to east, and paralleled the NS railroad embankment. Fine sediments exist in pools, and riffle substrate consisted of cobble and gravel. Historic land use in this watershed included agriculture and logging. Eroded banks and a marginal riparian area were present along the majority of Garner Run.

Perennial segment 40643-B flowed for 438 linear feet. Riparian vegetation was sparse with populations of multiflora rose (*Rosa multiflora,*) and autumn olive (*Eliagnus umbellata*). Forest species consisted of American sycamore (*Platanus occidentalis,*) black walnut (*Juglans nigra*) and black willow (*Salix nigra*).

6.3.2.1.2 Garner Run Sub-Watershed: UNT (40645) and Associated Tributaries

Ephemeral Stream Segments. Twenty-three (23) ephemeral stream segments, totaling 3,212 linear feet were located within the UNT 40645 and associated tributaries portion of the project area (Table 6-5 and Figures 6-2a & 6-2c). These ephemeral channels ranged from 50 to 279 linear feet in length. Coarse woody debris and vegetative materials were common within the ephemeral segments.

Forest included: black cherry (*Prunus serotina*) and yellow poplar (*Liriodendron tulipifera*), spicebush (*Lindera benzoin*), and paw paw (*Asimina triloba*). Lacking stable substrate, and sustainable stream flow, ephemeral channels offer limited habitat to aquatic organisms. Functions provided by these channels included; sources of fine sediment and organic nutrient output to higher order receiving streams.

Intermittent Stream Segments. Four (4) intermittent stream reaches of 40645 and associated tributaries, totaling 451 linear feet, exist within the project area (Table 6-5 and Figures 6-2a & 6-2c). The segments ranged from 43 to 171 linear feet. These channels originated from seasonal groundwater discharges. Intermittent channels were less than 2 feet wide with graded substrate, with the exception of 40564-Q, which flows downstream of a perennial channel. This intermittent channel was aggraded with sediments from an upslope haul road crossing. These channels flowed beneath the surface for an extended portion of the year, and epifaunal substrate was poor for aquatic colonization.

Perennial Stream Segments. 40645 and associated tributaries included two perennial segments located within the project area (Table 6-5 and Figures 6-2a & 6-2c).

Table 6-5. 40645 and Associated Tributaries
Stream Lengths in Linear Feet by Classification

Reach Name	Inside Project Boundary	Classification Within Project			Outside Project Boundary	Grand Total
		Ephemeral	Intermittent	Perennial		
40645	2,437	177	74	2,186	211	2,648
40645-A	182	182	0	0	0	182
40645-B	165	165	0	0	0	165
40645-C	54	54	0	0	0	54
40645-D	188	188	0	0	0	188
40645-E	119	119	0	0	0	119
40645-F	116	116	0	0	0	116
40645-G	171	171	0	0	0	171
40645-H	177	177	0	0	0	177
40645-I	74	74	0	0	0	74
40645-J	123	123	0	0	0	123
40645-K	91	91	0	0	0	91
40645-L	89	89	0	0	0	89
40645-M	192	192	0	0	0	192
40645-N	66	66	0	0	0	66
40645-O	116	116	0	0	0	116
40645-P	112	112	0	0	0	112
40645-Q	631	279	171	181	0	631
40645-R	242	242	0	0	0	242
40645-S	277	277	0	0	0	277
40645-T	91	91	0	0	0	91
40645-U	163	0	163	0	0	163
40645-V	61	61	0	0	0	61
40645-W	50	50	0	0	0	50
40645-X	43	0	43	0	0	43
Total	6,030	3,212	451	2,367	211	6,241

Perennial stream 40645 originated from groundwater discharges and flowed 2,186 linear feet within the project area. From the confluence with mainstem Garner Run (40643), to a point approximately 680 linear feet upstream, the riparian buffer consisted of maintained grass (*Fescue spp.*) and pasture, extending approximately 25 feet landward. A residence was present within the riparian area and the depletion of riparian vegetation had caused bank instability on both sides of the channel. Substrates varied throughout the length of this segment and provided opportunities for aquatic colonization. Stream 40645-Q flowed from an upstream groundwater discharge on the left descending bank of mainstem 40645 for 181 linear feet to an unimproved access road

crossing. Erosion at the access road crossing buried the channel, altering the surface flow from perennial to intermittent.

6.3.2.1.3 Garner Run Sub-Watershed: UNT (40649) and Associated Tributaries

Ephemeral Stream Segments. Thirty-six (36) ephemeral stream segments totaling 6,089 linear feet were located within the 40649 sub-watershed (Table 6-6 and Figures 6-2a & 6-2c). These segments ranged from 33 to 621 linear feet in length. Elevation within this watershed ranged from 1,020 feet to 1,440 feet.

Topography was steep and evidence of recent timber harvest was observed. Unimproved access roads existed throughout the valley, resulting in the diversion of natural drainage patterns, as evidenced by the presence of eroded ephemeral stream channels. The understory consisted of a diverse community of flora that are adapted to open canopy conditions, including: New York fern (*Thelypteris noveboracensis*), multiflora rose (*Rosa multiflora*), tulip poplar (*Liriodendron tulipifera*), black cherry (*Prunus serotina*), and witch hazel (*Hamamelis Virginiana)*.

Elimination of the forest canopy and erosion from unvegetated haul roads resulted in erosion, and many ephemeral channels exhibited scour, and downstream sediment deposition. Channel substrate was soil, sand, and clay. Lacking stable substrate, and sustainable stream flow ephemeral channels offer limited habitat to aquatic organisms. Functions provided included; sources of fine sediment and organic nutrient conveyance to higher order streams. Detritus accumulation was abundant in this watershed due to recent logging activities.

Intermittent Stream Segments. Ten (10) intermittent stream segments, totaling 1,454 linear feet were located within the 40649 sub-watershed (Table 6-6 and Figures 6-2a & 6-2c). These segments ranged from 10 to 343 linear feet. Un-vegetated areas resulting from recent logging activity and haul roads, led to increased soil erosion. Intermittent channels exhibited bank erosion and downstream sediment deposition. Substrate consisted of clay, cobble, and gravel. Land use was classified as forested (100%) consisting of recently timbered hardwoods and the vegetated riparian area was estimated to be greater than 25 feet for each channel.

Organic nutrient conveyance and habitat for aquatic organisms were present to a marginal degree within these segments. The densely vegetated watershed provides riparian areas along the stream banks. Stem density contained rooted vegetation within the active channel and provided sediment and detritus retention capability.

Perennial Stream Segments. Nine (9) perennial stream segments totaling 4,935 linear feet of stream channel were located within the UNT 40649 sub-watershed (Table 6-6 and Figures 6-2a & 6-2c). These segments ranged from 29 to 3,494 linear feet in length. The mainstem of 40649 originated from groundwater discharges and continued 3,494 feet to the project area boundary. Forested land use dominated the watershed, and one residence was located within the riparian area. Approximately 500 linear feet of maintained lawn was also identified in the riparian area. Remaining perennial segments were forested with timbered riparian areas. Vegetative cover in the residential area was dominated by landscaped grass.

Table 6-6. 40649 and Associated Tributaries Stream Lengths by Classification

Reach Name	Inside Project Boundary	Classification Within Project Boundary			Outside Project Boundary	Grand Total
		Ephemeral	Intermittent	Perennial		
40649	3,763	269	0	3,494	287	4,050
40649-L1	76	76	0	0	0	76
40649-L10	126	126	0	0	0	126
40649-L11	247	247	0	0	0	247
40649-L12	144	144	0	0	0	144
40649-L13	635	237	0	398	0	635
40649-L14	333	184	149	0	0	333
40649-L15	233	169	64	0	0	233
40649-L16	935	288	167	480	0	935
40649-L16a	218	218	0	0	0	218
40649-L16b	206	206	0	0	0	206
40649-L16c	192	192	0	0	0	192
40649-L17	621	621	0	0	0	621
40649-L18	273	273	0	0	0	273
40649-L19	343	0	343	0	0	343
40649-L2	200	130	0	70	0	200
40649-L3	214	33	0	181	0	214
40649-L4	206	112	0	94	0	206
40649-L5	144	144	0	0	0	144
40649-L6	145	71	0	74	0	145
40649-L7	194	194	0	0	0	194
40649-L8	207	207	0	0	0	207
40649-L9	220	220	0	0	0	220
40649-R1	153	153	0	0	0	153
40649-R10	69	0	69	0	0	69
40649-R11	168	68	100	0	0	168
40649-R12	394	80	314	0	0	394
40649-R12a	182	182	0	0	0	182
40649-R13	144	144	0	0	0	144
40649-R2	209	209	0	0	0	209
40649-R3	358	231	127	0	0	358
40649-R4	115	0	0	115	0	115
40649-R5	249	138	111	0	0	249
40649-R6	80	80	0	0	0	80
40649-R7	80	51	0	29	0	80
40649-R8	52	42	10	0	0	52
40649-R9	350	350	0	0	0	350
Total	12,478	6,089	1,454	4,935	287	12,765

6.3.2.1.4 Garner Run Sub-Watershed: UNT (40644) and Associated Tributaries

Ephemeral Stream Segments. Four (4) ephemeral stream segments, totaling 472 linear feet were located within the 40644 sub-watershed (Table 6-7 and Figures 6-2a & 6-2c). These segments ranged from 43 to 253 feet in length. Elevation within this watershed ranged from 1,020 feet to 1,540 feet.

Headwater channels were predominantly forested with riparian areas extending more than 25 feet from the top of bank. Vegetation was dominated by box elder (*Acer negundo*) and sugar maple (*Acer saccharum*), and multiflora rose (*Rosa multiflora*). Channel substrates were mineral soil with a thick duff layer of and other detritus material. Functions provided included; sources of fine sediment and organic nutrient conveyance to higher order receiving streams downslope.

Table 6-7. UNT 40644 and Associated Tributaries
Stream Lengths in Linear Feet by Classification

Reach Name	Inside Project Boundary	Classification Within Project			Outside Project Boundary	Grand Total
		Ephemeral	Intermittent	Perennial		
40644	1,791	0	0	1,791	0	1,791
40644-A	426	0	426	0	0	426
40644-UNT3	253	253	0	0	746	999
40644-UNT3a	662	0	662	0	429	1,091
40644-UNT3a1	132	132	0	0	146	278
40644-UNT3a2b	44	44	0	0	330	374
40644-UNT3b	43	43	0	0	456	499
Total	3,351	472	1,088	1,791	2,107	5,458

Intermittent Stream Segments. Two (2) intermittent stream segments totaling 1,088 linear feet were located within the UNT 40644 sub-watershed portion of the project area (Table 6-7 and Figures 6-2a & 6-2c). These segments were 426 and 662 linear feet in length, respectively.

One (1) intermittent tributary, 40644 UNT3a, originated from a groundwater discharge downslope of an existing residence located approximately 550 feet from the channel. Substrates consisted of cobble, gravel, and fine sediment. The riparian area consisted of black cherry (*Prunus serotina*), American hawthorne (*Crataegus tomentosa)*, and multiflora rose (*Rosa multiflora*).

Intermittent tributary 40644-A flowed into stream 40644. Substrate consisted of railroad ballast, fill material, and fine sediments. Riparian vegetation consisted of multiflora rose, (*Rosa multiflora*) and black willow (*Salix nigra*).

Perennial Stream Segments. One (1) perennial stream segment, totaling 1,791 linear feet was located within the 40644 watershed portion of the project area (Table 6-7 and Figures 6-2a & 6-2c). The forested riparian area was approximately 25 feet from the top of banks. Canopy was dominated by box elder (*Acer negundo*) and sugar maple (*Acer Saccharum*), while the understory was composed of multiflora rose (*Rosa multiflora*) and seedling recruitment of the canopy species.

This segment contained three water impoundments, which were created by beaver dams. Functions provided by the impoundments included flood flow retention and sediment toxicant retention. The riparian buffer was composed of maintained grasses and ornamental plantings.

6.3.2.1.5 Garner Run Sub-Watershed: UNT (40646) and Associated Tributaries

Ephemeral Stream Segments. Eleven (11) ephemeral stream segments, totaling 2,017 linear feet are located within the 40646 watershed portion of the project area (Table 6-8 and Figures 6-2a & 6-2c). These segments ranged from 71 to 302 feet in length. Elevation within this watershed ranged from 1,020 feet at the confluence to 1,520 feet on the adjacent ridge top.

The left descending bank of UNT 40646 received flow from multiple ephemeral channels. Functions provided included: sources of fine sediment and organic nutrient conveyance to higher order receiving streams downslope.

Table 6-8. UNT 40646 and Associated Tributaries
Stream Lengths in Linear Feet by Classification

Reach Name	Inside Project Boundary	Classification Within Project			Outside Project Boundary	Grand Total
		Ephemeral	Intermittent	Perennial		
40646	2,059	0	61	1,998	907	2,966
40646-D	116	116	0	0	11	127
40646-E	301	194	107	0	0	301
40646-E1	140	140	0	0	25	165
40646-F	591	0	591	0	417	1,008
40646-G	165	165	0	0	0	165
40646-H	265	265	0	0	0	265
40646-I	302	131	44	127	0	302
40646-J	485	302	183	0	0	485
40646-J1	206	206	0	0	0	206
40646-J2	194	0	194	0	0	194
40646-K	675	0	675	0	0	675
40646-K1	247	247	0	0	0	247
40646-K1a	180	180	0	0	0	180
40646-L	463	0	463	0	0	463
40646-L1	71	71	0	0	0	71
40646-M	96	0	96	0	0	96
Total	6,556	2,017	2,414	2,125	1,360	7,916

Intermittent Stream Segments. Nine (9) intermittent stream segments totaling 2,414 linear feet were located within the UNT 40646 watershed portion of the project area (Table 6-8 and Figures 6-2a & 6-2c). These segments ranged from 43 to 675 feet in length.

Runoff from Center Highlands Road had increased flow to the intermittent channels on the left descending bank and cut and fill from roadway construction had altered the stream dimension and pattern. Culvert pipes conveyed flows from 40646-L, 40646-K and 40646-F beneath Center Highlands Road. The riparian area consisted of sugar maple (*Acer saccharum*), American beech (*Fagus grandifolia*,), and multiflora rose (*Rosa multiflora*). Substrates consisted of sand, gravel, and detritus.

Perennial Stream Segments. Two (2) perennial stream segments, totaling 2,125 linear feet were located within the 40646 watershed portion of the project area (Table 6-8 and Figures 6-2a & 6-2c). Originating from groundwater discharges on left descending bank, stream 40646-I flowed 126 linear feet through forested habitat northwest to their confluence with stream 40646. Substrates were dominated by gravel and sand. Biological sampling indicated the presence of a diverse macroinvertebrate community.

6.3.2.1.6 Macroinvertebrate Community and Physiochemical Data

The three (3) Appendix B stations (GAR 1, GAR 3, and GAR 7) situated within the Garner Run watershed were sampled during 2 sample events (2010 Round 1, and 2010 Round 2) (Figure 6-3, Tables 6-9, 6-10, 6-11, and Appendix A).

Table 6-9. Habitat Data Summary for Garner Run Watershed Appendix B Sampling Stations (2010 Round 1 - 2010 Round 2)

	Season	2010 Round 1			2010 Round 2		
	Site ID	GAR 1	GAR 3	GAR 7	GAR 1	GAR 3	GAR 7
Wetted Width (feet)		8.0	0.9	12.1	9.0	2.2	16.7
Channel Width (feet)		20.0	2.3	14.0	12.5	2.8	16.7
Stream Depth (inches)		0.28	0.70	0.61	0.59	0.11	0.18
Canopy Cover		15%	<5%	35%	20%	5%	50%
Habitat Assessment and Score (and % of maximum possible score)		127/240 53%	123/240 51%	151/240 63%	144/240 60%	121/240 50%	163/240 68%
Substrate Characteristics	Bedrock	0%	0%	5%	5%	0%	0%
	Boulder	10%	5%	10%	10%	0%	0%
	Cobble	25%	15%	25%	30%	5%	20%
	Gravel	25%	40%	25%	30%	50%	30%
	Sand	20%	25%	20%	20%	35%	30%
	Silt	15%	15%	15%	5%	10%	20%
	Clay	5%	0%	0%	0%	0%	0%
	% Coarse Particulate Organic Matter (CPOM)	<5%	0%	15%	0%	5%	15%
	% Fine Particulate Organic Matter (FPOM)	0%	0%	0%	0%	0%	0%

Table 6-10. In Situ Physiochemical Data Summary for Garner Run Watershed Appendix B Sampling Stations (2010 Round 1 - 2010 Round 2)

Season	2010 Round 1			2010 Round 2		
Site ID	GAR 1	GAR 3	GAR 7	GAR 1	GAR 3	GAR 7
Water Temperature (^{o}C)	8.0	10.2	13.1	1.6	2.6	2.5
Dissolved Oxygen (ppm)	14.31	14.30	12.87	14.32	13.49	14.02
Conductivity (uS)	257.0	214.0	285.0	203.0	193.2	210.0
pH (standard units)	7.98	8.20	8.15	7.99	7.80	8.00

Table 6-11. Macroinvertebrate Data Summary for Garner Run Watershed Appendix B Sampling Stations (Spring 2009 - 2010 Round 2)

	2010 Round 1			2010 Round 2		
Metric	**GAR 1**	**GAR 3**	**GAR 7**	**GAR 1**	**GAR 3**	**GAR 7**
Taxa Richness	16	23	18	21	10	12
% EPT	4.30	42.94	5.86	12.28	15.38	2.22
% Ephemeroptera	2.15	4.12	1.80	0.00	0.55	0.56
No. Intolerant Taxa	6	16	11	7	6	4
% Tolerant Organisms	94.62	60.59	89.19	95.18	82.42	97.22
PADEP Tolerance Value	4.69	3.52	4.11	5.67	4.60	5.92
% Contribution Dominant Family	67.74	46.47	82.43	78.95	74.73	91.11
% Chironomidae	67.74	46.47	82.43	78.95	74.73	91.11
% Scrapers and Predators	9.68	18.82	9.01	6.58	0.55	2.78
% Filterers and Gatherers	89.78	55.88	89.64	89.91	84.62	95.56
Shannon-Wiener Diversity Index	1.3100	1.9988	0.9149	1.0189	0.9470	0.5050
Equitability Index	0.4725	0.6375	0.3165	0.3347	0.4113	0.2032

6.3.2.2 Grinage Run (40647) Watershed Overview

Grinage Run (40647) was an 858 acre watershed. Elevations within the watershed ranged from approximately 1,025 feet along the stream bottom valley to 1,580 feet at the adjacent ridge tops. The majority (92%) of land use within the watershed was classified as forested lands. Agricultural use was the second most common land use comprising (8%) of land cover. Within the project area, land cover consisted of forested habitat (97%), agricultural (1%) and urban development (1%) (e.g., roads and railroad). The headwater reaches of the watershed consisted of steep forested slopes interspersed with hay fields and pasture land on the ridge tops. The forest habitat consisted of: white oak (*Quercus alba*), American beech (*Fagus grandifolia*), and red maple (*Acer rubrum*). Understory species included spice bush (*Lindera bezoin*) and honeysuckle (*Lonicera spp*.). Grinage Run and its tributaries were designated as High-Quality Warm Water Fisheries (HQ-WWF) under 25 PA Code, Chapter 93. The approximately 67 acres of the Grinage Run watershed in the project area encompassed 10 stream segments, totaling 3,415 linear feet (Table 6.-12).

6.3.2.2.1 Ephemeral Stream Segments

Seven (7) ephemeral stream segments totaling, 1,262 linear feet were located within the Grinage Run watershed portion of the project area boundary (Table 6-12 and Figures 6-2a & 6-2c). The ephemeral segments ranged in length from 60 to 490 linear feet. Substrates consisted of mineral soil, sand, and clay. Riparian vegetation consisted of mature forest and extended more than 25 feet from the top of stream banks. Flora consisted of mature second growth deciduous tree species, including: white oak (*Quercus alba*), green ash (*Fraxinus pennsylvanica*), and red maple (*Acer rubrum*). Understory species consisted of spice bush (*Lindera benzoin*) and autumn olive (*Eleagnus umbelata*).

The Grinage Run (40647) watershed had numerous unimproved haul roads along the valley slope. These haul roads diverted overland flow and altered the natural drainage patterns. Functions provided included: sources of fine sediment and organic nutrient conveyance to higher order receiving streams downslope.

Table 6-12. Grinage Run Lengths in Linear Feet by Classification

Reach Name	Inside Project Boundary	Classification within Project Area			Outside Project Boundary	Total
		Ephemeral	Intermittent	Perennial		
40647	747	0		747	11,215	11,962
40647-T1	873	0	181	692	3,757	4,630
40647-T1h	60	60	0	0	34	94
40647-T1i	232	232	0	0	44	276
40647-T1j	909	490	419	0	0	909
40647-T1j1	114	114	0	0	0	114
40647-T1j2	101	101	0	0	0	101
40647-T1j3	145	145	0	0	0	145
40647-T1m	114	0	114	0	926	1,040
40647-T1m3	120	120	0	0	19	139
40647-R8b	0	0	0	0	85	85
Total	3,415	1,262	714	1,439	16,314	19,496

6.3.2.2.2 Intermittent Stream Segments

Three (3) intermittent stream segments, totaling 714 linear feet were located within the Grinage Run watershed portion of the project area (Table 6-12 and Figures 6-2a & 6-2c). These segments were 181 and 419 linear feet in length. Riparian vegetation was mature forest and extended approximately 25 feet from channel. The forest habitat consisted of mature second growth deciduous tree species, including: white oak (*Quercus alba*), American beech (*Fagus grandifolia*), and red maple (*Acer rubra*), while understory species consisted of spice bush (*Lindera benzoin*) and honeysuckle (*Lonicera spp.)*.

Unimproved roadway and timber harvest have resulted in erosion and sedimentation. The presence of rooted plants in the channel suggested that the reaches were dry for a significant portion of the year.

6.3.2.2.3 Perennial Stream Segments

Two (2) perennial segments, totaling 1,439 linear feet were located within the Grinage Run watershed portion of the project area (Table 6-12 and Figures 6-2a & 6-2c). These included 692 linear feet of stream 40647 T1 and 747 linear feet of Grinage Run (40641). UNT 40647 T1 exhibited a high gradient channel slope and substrates consisted of cobble and gravel.

The Grinage Run mainstem was located downstream of several residences and riparian vegetation had been converted into lawns, approximately 800 to 1000 feet landward of the stream. Grinage Run flowed parallel to Grinnage Run Road (TR-469) from the headwaters to the mouth, maintaining a short distance (i.e., 5 to 300 feet) from the road. Residences and the roadway encroach on the riparian area of the stream. Approximately 77 feet upstream from the

confluence with Garner Run was a culvert where Grinage Run flowed beneath the NS railroad embankment.

Forest land dominated the majority of the riparian zone. Species included: American sycamore (*Platanus occidentalis*), box elder (*Acer negundo*), and sugar maple (*Acer saccharum)*. Understory species included: spice bush (*Lindera benzoin)* and wingstem (*Verbesina alternifolia*).

6.3.2.2.4 Macroinvertebrate and Physiochemical Data

One (1) Appendix B station (GRR 3) was sampled during two (2) sampling events (2010 Round 1, 2010 Round 2) (Figure 6-3, Tables 6-13, 6-14, 6-15 and Appendix A).

Table 6-13. In- Situ Physiochemical Data Summary for Grinage Run Watershed Appendix B Sampling Stations (2010 Round 1 - 2010 Round 2)

Season	**2010 Round 1**	**2010 Round 2**
Site ID	**GRR 3**	**GRR 3**
Water Temperature (^{o}C)	7.6	7.4
Dissolved Oxygen (ppm)	16.03	8.90
Conductivity (uS)	156.0	207.0
pH (standard units)	7.55	6.80

Table 6-14. Habitat Data Summary for Grinnage Run Watershed Appendix B Sampling Stations (2010 Round 1 - 2010 Round 2)

	Season	2010 Round 1	2010 Round 2
	Site ID	GRR 3	GRR 3
Wetted Width (feet)		3.6	2.8
Channel Width (feet)		5.0	5.0
Stream Depth (inches)		0.21	0.15
Canopy Cover		10%	30%
Habitat Assessment and Score (and % of maximum possible score)		147/240 61%	140/240 58%
Substrate Characteristics	Bedrock	0%	0%
	Boulder	0%	0%
	Cobble	15%	15%
	Gravel	35%	40%
	Sand	30%	15%
	Silt	20%	10%
	Clay	0%	20%
	% Coarse Particulate Organic Matter (CPOM)	10%	20%
	% Fine Particulate Organic Matter (FPOM)	5%	0%

Table 6-15. Macroinvertebrate Data Summary for Grinnage Run Watershed Appendix B Sampling Stations (2010 Round 1 - 2010 Round 2)

Metric	GRR 3	GRR 3
Taxa Richness	32	17
% EPT	26.00	45.76
% Ephemeroptera	6.00	0.00
No. Intolerant Taxa	15	10
% Tolerant Organisms	56.00	52.54
PADEP Tolerance Value	4.44	4.12
% Contribution Dominant Family	39.50	39.55
% Chironomidae	39.50	39.55
% Scrapers and Predators	30.50	7.91
% Filterers and Gatherers	53.50	40.11
Shannon-Wiener Diversity Index	2.5019	1.9079
Equitability Index	0.7219	0.6734

6.3.2.3 Hargus Creek (40627)

The Hargus Creek (40627) watershed area is 13,866 acres and the 1,876 acre project area is predominantly situated within the Hargus Creek watershed, occupying (14%) of the total area. Hargus Creek flowed from south to north eventually to its confluence with South Fork Tenmile Creek (Table 6-16 and Figures 6-2a &-6-2d). Elevations ranged from approximately 1,000 feet to 1,500 feet.

Hargus Creek and its tributaries are designated High-Quality Warm Water Fisheries (HQ-WWF) under 25 PA Code Chapter 93.

Forested land and agriculture were the prominent land cover types in the Hargus Creek watershed. The portion of the Hargus Creek watershed within the project area contained a 70 linear foot perennial stream segment (Table 6-16). The left bank of the Hargus Creek was old field habitat, which was mowed to the stream's edge. Residences, barns, out-buildings, and agricultural land use were identified in these downstream reaches of Hargus Creek. Livestock had unlimited access to the stream. Flora located in these open areas included American sycamore (*Platanus occidentalis*), black willow (*Salix nigra*), red maple (*Acer rubrum*), black cherry (*Prunus serotina*), spicebush (*Lindera benzoin*), and American hornbeam (*Carpinus caroliniana*).

Table 6-16. Hargus Creek and Associated Tributaries
Stream Lengths in Linear Feet by Classification

Reach Name	Inside Project Boundary	Classification Within Project Boundary			Outside of Project Area	Total
		Ephemeral	Intermittent	Perennial		
40627	0	0	0	0	34,412	34,412
40627-E	70	0	0	70	1,388	1,458
Total	70	0	0	70	35,800	35,870

6.3.2.3.1 Macroinvertebrate and physiochemical data

Hargus Creek data are summarized in Tables 6-17, 6-18 and 6-19. Station 40267 HAR 1:S was sampled during Spring 2011(Appendix A).

Table 6-17. In Situ Physiochemical Data Summary for Hargus Creek Watershed (Standard RBP) Sampling Stations (Spring 2011)

Season	Spring 2011
Site ID	**40627 HAR 1:S**
Water Temperature (^{o}C)	1.0
Dissolved Oxygen (ppm)	14.02
Conductivity (uS)	198.0
pH (standard units)	8.08

Table 6-18. Habitat Data Summary for Hargus Creek Watershed Macroinvertebrate (Standard RBP) Sampling Stations (Spring 2011)

Season		Spring 2011
Site ID		**40627 HAR 1:S**
Wetted Width (feet)		20.0
Channel Width (feet)		30.0
Stream Depth (feet)		0.75
Canopy Cover		60%
Habitat Assessment and Score (and % of maximum possible score)		127/240 53%
Substrate Characteristics	Bedrock	0%
	Boulder	10%
	Cobble	25%
	Gravel	25%
	Sand	40%
	Silt	0%
	Clay	0%
	% Coarse Particulate Organic Matter (CPOM)	15%
	% Fine Particulate Organic Matter (FPOM)	0%

Table 6-19. Summary Statistics for RBP Points Collected at Hargus Creek

	Spring 2011
Metric	40627 HAR 1:S
Taxa Richness	11
% EPT	4.60
% Ephemeroptera	0.00
No. Intolerant Taxa	4
% Tolerant Organisms	94.83
PADEP Tolerance Value	5.73
% Contribution Dominant Family	84.48
% Chironomidae	84.48
% Scrapers and Predators	4.60
% Filterers and Gatherers	90.23
Shannon-Wiener Diversity Index	0.7403
Equitability Index	0.3087

6.3.2.4 Hoge Run (40632)

Hoge Run (40632) watershed was adjacent to House Run 40635 watershed. Hoge Run 40632 flowed into McCourtney Run 40628 and was located several miles south and west of the confluence of McCourtney Run 40628 and Hargus Creek 40627 (Tables 6-20 through 6-24 and Figures 6.3.1a through 6.3.1d). Elevations within the Hoge Run 40632 watershed ranged from 1,000 feet to 1,480 feet.

Greater than half (65%) of the Hoge Run (40632) watershed lies within the project area. Land use within the watershed was comprised of forest (77%) and agriculture (20%). Urban development (i.e., roads and bridges) comprised (2%) of the remaining land use. Within the project area, land use consisted of forest (75%), agriculture (21%), and high and low intensity urban development (2%). Flora consists of white oak (*Quercus alba)*, red oak (*Quercus rubra*), and red maple (*Acer rubrum*). Understory species included: spicebush (*Lindera benzoin)* witch hazel (*Hammamelis virginiana)*, jewelweed (*Impatiens capensis*), Christmas fern (*Polystichum acrostichoides*), and multiflora rose (*Rosa multiflora*). Agricultural activities included livestock grazing and hay production. Hay production occurred on the upper portion of the valley slopes.

Hoge Run and its tributaries are designated as High-Quality Warm Water Fisheries (HQ-WWF) under 25 PA Code Chapter 93. Streams 40633 and 40634 are classified as Exceptional Value (EV) waterways under 25 PA Code Chapter 93.

6.3.2.4.1 Hoge Run (40632) and Associated Tributaries

Ephemeral Stream Segments. One hundred and five (105) ephemeral stream segments totaling 16,605 linear feet were identified within the project area (Tables 6-20 through 6-23 and Figures 6-2a, 6-2b and 6-2d). Ephemeral segment lengths ranged from 17 to 627 linear feet.

Agricultural activities were identified throughout the Hoge Run watershed. Agricultural access roads and livestock grazing had altered natural drainage patterns, creating new channels or lengthening existing ephemeral channels. Ephemeral channel substrates adjacent to roadways tended to be silt soil and sand dominant, and included an abundance of gravel sized substrate deposited from the roadway. Channels formed in undisturbed areas contained mineral soil and detritus substrates.

The riparian buffer consisted of maintained yards, grazing areas, and forested segments. Channels adjacent to the road exhibited riparian buffers dominated by herbaceous species such as multiflora rose (*Rosa multiflora*) and wild grape (*Vitus sp.*). Riparian areas in pasture settings were composed of grasses and random trees. Ephemeral segments within Hoge Run watershed were high gradient and lacked bed and bank morphology. Functions provided by these channels included: sources of fine sediment transport and organic nutrient conveyance to higher order receiving streams downslope.

Intermittent Stream Segments. Thirty-five (35) intermittent stream channels, totaling 4,074 linear feet, were identified within the Hoge Run watershed area (Tables 6-20 through 6-23 and Figures 6-2a, 6-2b and 6-2d). Stream lengths ranged from 18 linear feet to 385 linear feet.

Intermittent stream channel segments were located primarily in forested portions of the project area. Groundwater discharges collected into high gradient channels that ranged in width from one half (0.5) to four (4) feet in width. Riparian vegetation consisted of hickories (*Carya spp.*), red maple (*Acer rubrum*), spicebush (*Lindera benzoin*), and multiflora rose (*Rosa multiflora*). Stream 40532-HH which was located in a heavily grazed pasture, and riparian vegetation consisted of Fescues (*Fescue spp.*), sweet flag (*Acorus calamus*), and multiflora rose (*Rosa multiflora*). This channel exhibited eroded banks and increased sedimentation due to unrestricted livestock access.

Perennial Stream Segments. Nineteen (19) perennial streams were identified in the project area, totaling 26,033 linear feet area (Tables 6-20 through 6-23 and Figures 6-2a, 6-2b and 6-2d). Perennial segments occurred in a wide variety of cover types from dense forest with a wide riparian buffer to segments adjacent roadways, which were void of riparian vegetation. Agricultural activity has resulted in sections of perennial stream channel that are void of riparian vegetation. Vegetative cover in agriculture areas consisted of grasses and forbs, with sparse trees. Gravel and cobble were the dominant substrates in these perennial channels. Agricultural land uses may negatively affect the ability of these perennial reaches to support a diverse biological community.

Table 6-20. Hoge Run and Associated Tributaries Stream Lengths in Linear Feet by Classification

Reach Name	Inside Project Boundary	Classification Within Project Boundary			Outside Project Boundary	Grand Total
		Ephemeral	Intermittent	Perennial		
40632	13,893	23	0	13,870	785	14,678
40632 RR	228	228	0	0	0	228
40632 RR1	144	144	0	0	0	144
40632 SS	251	251	0	0	0	251
40632 SS1	89	89	0	0	0	89
40632 TT	120	120	0	0	0	120
40632 TT1	101	101	0	0	0	101
40632-AA	225	30	195	0	0	225
40632-aaa	129	81	48	0	0	129
40632-BB	289	158	131	0	0	289
40632-CC	191	191	0	0	0	191
40632-DD	316	277	39	0	0	316
40632-EE	142	142	0	0	0	142
40632-FF	290	290	0	0	0	290
40632-GG	605	605	0	0	0	605
40632-H	829	384	0	445	0	829
40632-H1	228	108	120	0	0	228
40632-H1a	54	54	0	0	0	54
40632-H2	222	222	0	0	0	222
40632-H5	177	177	0	0	0	177
40632-HH	513	128	385	0	0	513
40632-I	991	72	145	774	0	991
40632-I1	291	291	0	0	0	291
40632-I1a	44	44	0	0	0	44
40632-I2	68	68	0	0	0	68
40632-I3	51	51	0	0	0	51
40632-I4	45	45	0	0	0	45
40632-I5	48	48	0	0	0	48
40632-J	1,775	247	0	1,528	0	1,775
40632-J10	282	0	0	282	0	282
40632-J11	367	94	0	273	0	367
40632-J12	89	89	0	0	0	89
40632-J13	169	169	0	0	0	169
40632-J14	65	65	0	0	0	65
40632-JJ	2,434	128	244	2,062	0	2,434
40632-JJ1	50	50	0	0	0	50
40632-JJ10	108	0	108	0	0	108
40632-JJ11	89	17	72	0	0	89
40632-JJ12	105	105	0	0	0	105
40632-JJ13	309	241	68	0	0	309
40632-JJ14	168	0	168	0	0	168
40632-JJ15	147	147	0	0	0	147
40632-JJ2	99	59	0	40	0	99
40632-JJ2a	113	113	0	0	0	113
40632-JJ2a1	62	62	0	0	0	62
40632-JJ3	72	72	0	0	0	72
40632-JJ3a	35	35	0	0	0	35
Total	27,112	6,115	1,723	19,274	785	27,897

Table 6-21. Hoge Run and Associated Tributaries Stream Lengths in Linear Feet by Classification

Reach Name	Inside Project Boundary	Classification Within Project Boundary			Outside Project Boundary	Grand Total
		Ephemeral	Intermittent	Perennial		
40632-JJ4	107	107	0	0	0	107
40632-JJ5	179	179	0	0	0	179
40632-JJ6	245	153	92	0	0	245
40632-JJ6a	70	70	0	0	0	70
40632-JJ6b	102	102	0	0	0	102
40632-JJ7	199	199	0	0	0	199
40632-JJ8	165	0	165	0	0	165
40632-JJ9	242	124	118	0	0	242
40632-K	1,174	0	68	1,106	509	1,683
40632-K1	255	72	183	0	0	255
40632-K10	123	123	0	0	0	123
40632-K11	102	102	0	0	0	102
40632-K12	189	0	189	0	0	189
40632-K4	51	51	0	0	185	236
40632-K5	213	213	0	0	0	213
40632-K6	45	45	0	0	0	45
40632-K7	70	70	0	0	0	70
40632-K8	107	107	0	0	0	107
40632-K9	174	174	0	0	0	174
40632-KK	205	205	0	0	0	205
40632-L	734	0	0	734	0	734
40632-L1	277	94	183	0	0	277
40632-L1a	145	102	43	0	0	145
40632-L1a1	272	239	33	0	0	272
40632-L1b	412	271	0	141	0	412
40632-L1b1	140	25	80	35	0	140
40632-LL	129	129	0	0	0	129
40632-M	1,263	461	87	715	0	1,263
40632-M1	228	32	35	161	0	228
40632-M1a	47	0	47	0	0	47
40632-M2	237	69	168	0	0	237
40632-M3	109	62	47	0	0	109
40632-M4	53	53	0	0	0	53
40632-MM	119	119	0	0	0	119
40632-N	553	451	0	102	0	553
40632-N1	23	23	0	0	0	23
40632-N2	220	220	0	0	0	220
40632-NN	825	259	0	566	0	825
40632-NN1	76	76	0	0	0	76
40632-NN2	58	58	0	0	0	58
40632-NN3	115	115	0	0	0	115
40632-NN4	77	77	0	0	0	77
40632-NN5	108	108	0	0	0	108
40632-NN6	141	141	0	0	0	141
40632-NN7	135	135	0	0	0	135
40632-NN8	204	0	0	204	0	204
40632-O	155	137	18	0	0	155
40632-OO	479	0	0	479	0	479
40632-OO1	102	75	27	0	0	102
Total	11,453	5,627	1,583	4,243	694	12,147

Table 6-22. Hoge Run and Associated Tributaries
Stream Lengths in Linear Feet by Classification

Reach Name	Inside Project Boundary	Classification Within Project Boundary			Outside Project Boundary	Grand Total
		Ephemeral	Intermittent	Perennial		
40632-OO2	245	245	0	0	0	245
40632-OO2a	60	60	0	0	0	60
40632-P	2,285	183	0	2,102	47	2,332
40632-P1	627	627	0	0	12	639
40632-P1a	182	182	0	0	0	182
40632-P1b	215	215	0	0	0	215
40632-P1c	338	338	0	0	0	338
40632-P2	118	118	0	0	0	118
40632-P3	114	0	114	0	0	114
40632-P4	313	213	100	0	0	313
40632-P4a	81	81	0	0	0	81
40632-P4b	65	65	0	0	0	65
40632-P5	324	305	19	0	0	324
40632-P5a	87	87	0	0	0	87
40632-P6	335	335	0	0	0	335
40632-P7	304	0	304	0	0	304
40632-P8	91	0	91	0	0	91
40632-PP	314	314	0	0	0	314
40632-Q	348	348	0	0	0	348
40632-R	204	204	0	0	0	204
40632-R2	0	0	0	0	257	257
40632-UU	461	321	140	0	0	461
40632-VV	199	199	0	0	0	199
40632-WW	423	423	0	0	0	423
40632-XX	414	0	0	414	0	414
Totals	8,147	4,863	768	2,516	316	8,463

Table 6-23. Hoge Run and Associated Tributaries
Stream Lengths in Linear Feet by Classification

Reach Name	Inside Project Boundary	Classification Within Project Boundary			Outside Project Boundary	Grand Total
		Ephemeral	Intermittent	Perennial		
Totals	46,712	16,605	4,074	26,033	1,795	48,507

6.3.2.4.2 Hoge Run (UNT 40633), (UNT 40634) and Associated Tributaries

Two un-named tributaries to Hoge Run have been designated as EV streams under 25 PA Code, Chapter 93. Lower portions of these sub-watersheds flowed through the project area for 1,901 linear feet (Table 6-24 and Figure 6-2a and 6-2b).

The riparian areas of these stream segments were forested until approximately the last 800 linear feet, where private residences and old field habitat are adjacent to the channel. Both streams passed through a culvert to cross Hoge Run Road to make their confluence with Hoge Run.

Ephemeral Stream Segments. Three (3) ephemeral segments exist in the project area, totaling 550 linear feet ((Table 6-24 and Figure 6-2a and 6-2b). Functions provided by these channels included: sources of fine sediment and organic nutrient conveyance to higher order receiving streams downslope.

Intermittent Stream Segments. Two hundred twenty-nine (229) linear feet of one intermittent stream segment existed in the project area (Table 6-24 and Figure 6-2a and 6-2b).

This channel was situated within a forested headwater setting and provided seasonal conveyance of ground water, habitat for aquatic organisms, and the transport of nutrients.

Perennial Stream Segments. Two (2) perennial segments, 40644 and 40634, totaling 1,122 linear feet existed within the project boundary (Table 6-24 and Figure 6-2a and 6-2b).

The lower segments of these channels were bordered by residential and old field land uses. Both streams passed through a culvert beneath Hoge Run Road and continued to their confluence with Hoge Run.

The riparian areas were un-vegetated and anthropogenic disturbances such as yard maintenance and the clearing of bank vegetation may have a negative effect on the ability of each reach to support a diverse aquatic community. The culvert crossings may inhibit upstream migration of aquatic organisms.

Table 6-24. Hoge Run and Associated Tributaries

Reach Name	Inside Project Boundary	Classification Within Project Boundary			Outside Project Area	Grand Total
		Ephemeral	Intermittent	Perennial		
40634	548	0	0	548	4,433	4,981
40634-A	379	379	0	0	124	503
40634-B	270	41	229	0	998	1,268
40634-B3a	130	130	0	0	9	139
40633	574	0	0	574	0	574
Totals	1,901	550	229	1,122	5,564	7,465

6.3.2.4.3 Macroinvertebrate and Physiochemical Data.

Three (3) Appendix B stations (HOG 1, HOG 2, and HOG 3) were sampled during 2 sample events (2010 Round 1, and 2010 Round 2) (Figure 6-3, Tables 6-25, 6-26, 6-27 and Appendix A).

Table 6-25. Habitat Data Summary for Hoge Run Watershed Appendix B Sampling Stations (2010 Round 1- 2010 Round 2)

	Season	2010 Round 1			2010 Round 2		
	Site ID	HOG 1	HOG 2	HOG 3	HOG 1	HOG 2	HOG 3
Wetted Width (feet)		4.1	4.3	2.9	6.0	3.0	1.8
Channel Width (feet)		5.3	6.3	3.5	6.0	3.5	6.5
Stream Depth (feet)		0.3	0.13	0.17	0.55	0.16	0.20
Canopy Cover		0%	15%	0%	5%	10%	0%
Habitat Assessment and Score (and % of maximum possible score)		127/240 53%	139/240 58%	95/240 40%	150/240 63%	177/240 77%	77/240 32%
Substrate Characteristics	Bedrock	0%	0%	0%	0%	0%	0%
	Boulder	10%	5%	0%	5%	5%	0%
	Cobble	25%	20%	0%	30%	35%	5%
	Gravel	35%	30%	20%	35%	30%	20%
	Sand	20%	25%	30%	15%	20%	40%
	Silt	10%	20%	45%	15%	0%	30%
	Clay	0%	0%	0%	0%	5%	5%
	% Coarse Particulate Organic Matter (CPOM)	0%	10%	0%	0%	0%	0%
	% Fine Particulate Organic Matter (FPOM)	0%	0%	0%	0%	0%	0%

Table 6-26. In Situ Physiochemical Data Summary for Hoge Run Watershed Appendix B Sampling Stations (2010 Round 1 - 2010 Round 2)

Season	2010 Round 1			2010 Round 2		
Site ID	HOG 1	HOG 2	HOG 3	HOG 1	HOG 2	HOG 3
Water Temperature (^{o}C)	15.2	20.3	19.1	4.0	1.1	5.1
Dissolved Oxygen (ppm)	10.74	11.41	11.11	13.30	13.70	12.49
Conductivity (uS)	212.0	257.0	237.0	200.0	260.0	157.0
pH (standard units)	8.71	8.58	7.95	8.08	7.74	8.09

Table 6-27. Macroinvertebrate Data Summary for Hoge Run Watershed Appendix B Sampling Stations (Spring 2009 - 2010 Round 2)

	2010 Round 1			2010 Round 2		
Metric	**HOG 1**	**HOG 2**	**HOG 3**	**HOG 1**	**HOG 2**	**HOG 3**
Taxa Richness	22	15	12	33	17	6
% EPT	6.69	3.67	14.78	55.56	12.29	1.76
% Ephemeroptera	2.51	0.46	8.26	2.78	0.00	0.00
No. Intolerant Taxa	12	6	5	23	8	2
% Tolerant Organisms	77.41	94.04	86.09	32.78	86.59	98.68
PADEP Tolerance Value	4.27	5.27	4.92	3.79	4.76	5.33
% Contribution Dominant Family	48.95	86.24	69.13	26.11	78.21	96.92
% Chironomidae	48.95	86.24	69.13	23.33	78.21	96.92
% Scrapers and Predators	15.90	5.50	17.39	24.44	7.82	0.44
% Filterers and Gatherers	81.59	89.45	80.43	31.11	79.89	97.80
Shannon-Wiener Diversity Index	1.7962	0.7355	1.2761	2.5735	1.0555	0.1854
Equitability Index	0.5811	0.2716	0.5135	0.7360	0.3725	0.1035

6.3.2.5 House Run (40635) Overview

House Run (40635) flows from west to east along Bristoria Road. The confluence of Garner Run (40643) and House Run (40635) forms the mainstem of McCourtney Run (40628). Elevations within the watershed ranged from approximately 1,100 feet to 1,530 feet. Land use consisted of forest (85%); agriculture (15%); and public roads, railroads, and commercial facilities (1%). Within the project area, land use consisted of agriculture (21%), forest (78%) while developed lands (combination of high and low density urban development such as residential, roads, and commercial) comprised (2%). Flora consisted of white oak (*Quercus alba*), red oak (*Quercus rubrum*), yellow poplar (*Liriodendron tulipifera*), box elder (*Acer negundo*), spicebush (*Lindera benzoin*), and flowering dogwood (*Cornus florida*).

House Run and its tributaries have been designated as High-Quality Warm Water Fisheries (HQ-WWF) under 25PA Code Chapter 93. Streams 40636 and 40638 are classified as EV waterways. The project area contained 15,949 linear feet of stream channel (Table 6-28 and Figures 6-2a, 6-2b, and 6-2c). Three tributaries to House Run include streams 40636, 40635-M, and 40635-L.

Table 6-28. House Run Watershed Total Lengths in Linear Feet by Classification

Reach Name	Inside Project area	Classification Within Project Boundary			Outside Project Area	Grand Total
		Ephemeral	Intermittent	Perennial		
Total	**15,949***	**5,025***	**1,109**	**9,815**	**25,039**	**40,988***

* Includes 1,622 LF of stream channel within the watershed of UNT40638 that was not classified. The stream was assigned a preliminary classification of ephemeral; however, it was not included in jurisdictional determination.

6.3.2.5.1 40635 and Associated Tributaries (UNT 40635-L and UNT 40635-M)

Ephemeral Stream Segments. Nine (9) ephemeral stream segments, totaling 970 linear feet were located within the project area (Table 6-29 and Figures 6-2a, 6-2b and 6-2c). These segments ranged in length from 26 to 189 feet.

These headwater streams were high gradient streams with substrates dominated by mineral soil and organic material. The upper reaches of the watershed are forested and exhibit a riparian area approximately 25 feet in width. Vegetation was comprised of red maple (*Acer rubrum*), American beech (*Fagus grandifolia)*, stinging nettle (*Urtica dioica*), and multiflora rose (*Rosa multiflora*). Functions provided included: sources of fine sediment and organic nutrient conveyance to higher order receiving streams downslope.

Intermittent Stream Segments. Five (5) intermittent segments, totaling nine hundred 993 linear feet were located within the project area (Table 6-29 and Figures 6-2a, 6-2b and 6-2c). These segments ranged from 29 to 403 linear feet.

Substrates were dominated by sand and gravel. Functions provided included conveyance of organic nutrients, bed load materials, and habitat for macroinvertebrates.

Perennial Stream Segments. Eight (8) perennial stream channels, totaling 5,828 linear feet flowed through the project area (Table 6-29 and Figures 6-2a, 6-2b and 6-2c). Segment lengths ranged from 130 linear feet to 2,383 linear feet.

Substrates consisted of sand and silt. In agricultural areas, livestock had unrestricted access to the streams. Reaches of pasture adjacent to the mainstem provided minimal riparian area. One (1) residence was located near the confluence of 40635-L and its tributaries. The riparian area throughout a 500 foot section of the stream was dominated by grasses. Vegetation included black willow (*Salix nigra*), black walnut (*Juglans nigra*), American sycamore (*Platanus occidentalis*), witch hazel (*Hamamelis virginiana*), and garlic mustard (*Alliaria petiolata*).

Table 6-29. House Run (40635) and UNTs 40635-L and 40635-M Lengths in Linear Feet by Classification

Reach Name	Inside Project area	Classification Within Project Boundary			Outside Project Area	Grand Total
		Ephemeral	Intermittent	Perennial		
40635	2,383	0	0	2,383	15,622	18,005
40635-L	1,886	108	0	1,778	0	1,886
40635-L1	211	0	0	211	0	211
40635-L1a	29	0	29	0	0	29
40635-L2	599	145	73	381	0	599
40635-L2a	70	70	0	0	0	70
40635-L2b	130	0	0	130	0	130
40635-L2c	96	96	0	0	0	96
40635-L3	454	189	265	0	0	454
40635-L3a	222	0	222	0	0	222
40635-L4	370	0	0	370	0	370
40635-L5	334	127	0	207	0	334
40635-L5a	368	0	0	368	0	368
40635-M	441	38	403	0	146	587
40635-M1	26	26	0	0	0	26
40635-M2	173	173	0	0	0	173
Total	7,791	970	993	5,828	15,768	23,559

6.3.2.5.2 **(**UNT 40636) and Associated Tributaries

Ephemeral Stream Segments. Eighteen (18) ephemeral channels, totaling 2,433 linear feet flowed into the project area (Table 6-30 and Figures 6-2a, 6-2b and 6-2c).). Channel lengths ranged from 51 to 311 linear feet.

Dominant substrate was silt and detritus. Recent logging activity has resulted in large woody debris in and around the stream channels. Erosion from un-improved haul roads has contributed additional sediments. Functions included sources of fine sediment and organic nutrient conveyance to higher order receiving streams downslope.

Intermittent Stream Segments. Two (2) intermittent channels (40636-C and 40636-I4), measuring 55 and 61 linear feet, were present in the project area (Table 6-30 and Figures 6-2a, 6-2b and 6-2c). Substrates consisted of sand and silt and riparian areas consisted of red maple (*Acer rubrum*) and multiflora rose (*Rosa multiflora*).

Perennial Stream Segments. Five (5) perennial stream segments existed in the project area, totaling 3,986 linear feet (Table 6-30 and Figures 6-2a, 6-2b and 6-2c). Lengths ranged from 164 linear feet to 2,719 linear feet.

Table 6-30. UNT 40636 and Associated Tributaries
Stream Lengths in Linear Feet by Classification

Reach Name	Inside Project area	Classification Within Project Boundary			Outside Project Area	Grand Total
		Ephemeral	Intermittent	Perennial		
40636	**3,026**	306	0	2,720	334	3,360
40636-A	**117**	117	0	0	0	117
40636-B	**311**	311	0	0	0	311
40636-C	**301**	0	55	246	0	301
40636-D	**224**	59	0	165	0	224
40636-D1	**70**	70	0	0	0	70
40636-E	**189**	189	0	0	0	189
40636-F	**90**	90	0	0	0	90
40636-G	**112**	112	0	0	0	112
40636-G1	**51**	51	0	0	0	51
40636-H	**99**	99	0	0	0	99
40636-I	**716**	116	0	599	0	716
40636-I1	**136**	136	0	0	0	136
40636-I2	**62**	62	0	0	0	62
40636-I3	**122**	122	0	0	0	122
40636-I4	**245**	184	61	0	0	245
40636-J	**121**	121	0	0	0	121
40636-K	**60**	60	0	0	0	60
40636-L	**227**	227	0	0	0	227
40636-M	**257**	0	0	257	0	257
Total	**6,536**	**2,433**	**116**	**3,986**	**334**	**6,870**

One (1) residence was identified near the confluence of 40636 and its associated tributaries. The riparian area was dominated by grasses, with little or no trees. Floodplain species included black

willow (*Salix nigra*), black walnut (*Juglans nigra*), American sycamore (*Platanus occidentalis*), witch hazel (*Hamamelis virginiana*), and garlic mustard (*Alliaria petiolata*).

6.3.2.5.3 **(**UNT 40638) and Associated Tributaries

UNT 40638 and several associated tributaries occur within the 404 project area near the conveyor pad on the west boundary of the Hoge Run watershed (Table 6-31 and Figures 6-2a, 6-2b and 6-2c). These channels were investigated and given a preliminary classification, however the preliminary delineations were not confirmed during the jurisdictional determination. Situated high in the watershed, the 1,622 linear feet of unclassified channels were assigned a preliminary classification of ephemeral.

Table 6-31. UNT 40638 and Associated Tributaries
Stream Lengths in Linear Feet by Classification

Reach Name	Inside Project area	Classification Within Project Boundary			Outside Project Area	Grand Total
		Ephemeral	Intermittent	Perennial		
40638	380	0	0	0	6,152	6,152
40638-E	51	0	0	0	1,629	1,629
40638-E2	127	0	0	0	305	305
40638-E2a	69	0	0	0	171	171
40638-E2a1	122	0	0	0	94	94
40638-E3	147	0	0	0	476	476
40638-J	152	0	0	0	110	110
40638-H	168	0	0	0	0	0
40638-G	165	0	0	0	0	0
40638-F	128	0	0	0	0	0
40638-E2a1a	57	0	0	0	0	0
40638-I	56	0	0	0	0	0
Total	**1,622**	**0**	**0**	**0**	**8,937**	**8,937**

6.3.2.5.4 Macroinvertebrate Community and Physiochemical Data.

Two (2) Appendix B stations (HOU 1, HOU 2) located along the main stem (Figures 6.3 Tables 6-32, 6-33, 6-34, and Appendix A) were sampled during 2 sampling events (2010 Round 1, and 2010 Round 2).

Table 6-32. Habitat Data Summary for House Run Watershed (PA Appendix B) Sampling Stations (2010 Round 1 - 2010 Round 2).

Season		2010 Round 1		2010 Round 2	
Site ID		HOU 1	HOU 2	HOU 1	HOU 2
Wetted Width (feet)		12.2	14.0	2.0	11.9
Channel Width (feet)		17.0	22.0	6.0	12.9
Stream Depth (feet)		0.39	0.30	0.11	0.30
Canopy Cover		60%	50%	20%	20%
Habitat Assessment and Score (and % of maximum possible score)		142/240 59%	155/240 65%	140/240 58%	151/240 63%
Substrate Characteristics	Bedrock	5%	0%	15%	0%
	Boulder	5%	5%	5%	0%
	Cobble	20%	25%	10%	30%
	Gravel	25%	25%	35%	35%
	Sand	25%	25%	20%	20%
	Silt	15%	20%	5%	15%
	Clay	5%	0%	10%	0%
	% Coarse Particulate Organic Matter (CPOM)	10%	5%	30%	5%
	% Fine Particulate Organic Matter (FPOM)	0%	0%	10%	0%

Table 6-33. In situ Physiochemical Data Summary for House Run Watershed (PA Appendix B) Sampling Stations (2010 Round 1 - 2010 Round 2)

Season	2010 Round 1		2010 Round 2	
Site ID	HOU 1	HOU 2	HOU 1	HOU 2
Water Temperature (^{o}C)	18.3	16.3	6.2	1.4
Dissolved Oxygen (ppm)	10.20	11.30	11.80	14.55
Conductivity (uS)	127.9	154.5	262.0	174.4
pH (standard units)	8.29	8.25	7.54	7.87

Table 6-34 Macroinvertebrate Data Summary for House Run Watershed Appendix B Sampling Stations (Spring 2009 - 2010 Round 2)

	2010 Round 1		2010 Round 2	
Metric	**HOU 1**	**HOU 2**	**HOU 1**	**HOU 2**
Taxa Richness	23	18	12	28
% EPT	6.40	4.82	70.90	40.12
% Ephemeroptera	4.07	3.61	0.00	1.20
No. Intolerant Taxa	14	8	8	15
% Tolerant Organisms	82.56	71.08	17.99	59.28
PADEP Tolerance Value	4.17	4.72	4.08	4.64
% Contribution Dominant Family	52.91	35.54	68.25	42.51
% Chironomidae	52.91	35.54	14.29	42.51
% Scrapers and Predators	24.42	47.59	14.29	7.78
% Filterers and Gatherers	72.67	48.19	15.87	52.10
Shannon-Wiener Diversity Index	1.8684	2.1762	1.3354	1.9581
Equitability Index	0.5959	0.7529	0.5374	0.5876

6.3.2.6 McCourtney Run (40628)

McCourtney Run (40628) flowed from southwest to northeast along Golden Oaks Road (SR 0018) to its confluence with Hargus Creek (40627) near the intersection of SR 0018 and Hargus Creek Road (Table 6-35 and Figures 6-2a, 6-2c and 6-2d). The McCourtney Run watershed encompassed 9,079 acres, located in Center Township, Greene County, Pennsylvania. Elevations within the watershed ranged from approximately 980 feet to 1,470 feet.

Land use consisted of 78% forestland/scrub-shrub complex, 13% developed lands (combination of high and low density development such as residential, roads, rail road, commercial), and 9% agricultural lands (Grasslands/Cropland). Flora generally consisted of hickory (*Carya spp.*), red maple (*Acer rubrum*), spicebush (*Lindera benzoin*), and multiflora rose (*Rosa multiflora*). McCourtney Run and its tributaries are classified as High-Quality Warm Water Fisheries (HQ-WWF) under 25 PA Code Chapter 93.

Table 6-35. UNT 40628 and Associated Tributaries Stream Lengths in Linear Feet by Classification

Reach Name	Inside Project Boundary	Classification Within Project Boundary			Outside of Project Area	Grand Total
		Ephemeral	Intermittent	Perennial		
40628	861	0	0	861	11,298	12,159
40628-A	71	0	71	0	1,542	1,613
40628-AA	36	36	0	0	118	154
40628-BB	50	50	0	0	367	417
40628-CC	26	26	0	0	146	172
40628-EE	21	21	0	0	158	179
40628-H	638	106	95	437	244	882
40628-H1	306	306	0	0	0	306
40628-H2	171	171	0	0	0	171
40628-H3	76	76	0	0	0	76
40628-H4	88	0	88	0	0	88
40628-I	1,194	533	0	660	0	1,194
40628-I1	250	250	0	0	0	250
40628-I2	552	552	0	0	0	552
40628-I2a	54	54	0	0	0	54
40628-J	71	0	71	0	2,196	2,267
40628-K	72	0	0	72	2,232	2,304
40628-Q	78	78	0	0	207	285
40628-UNT10	707	707	0	0	1	708
40628-UNT11	413	413	0	0	636	1,049
40628-UNT11a	130	130	0	0	21	151
40628-UNT4	1,172	0	104	1,068	829	2,001
40628-UNT4c	15	0	15	0	1,184	1,199
40628-UNT4e	451	252	115	84	59	510
40628-UNT4e1	75	75	0	0	0	75
40628-UNT4e2	169	137	32	0	0	169
40628-UNT4e2a	72	72	0	0	0	72
40628-UNT4e2b	44	44	0	0	0	44
40628-UNT4f	305	0	305	0	559	864
40628-UNT4f1	24	24	0	0	108	132
40628-UNT6	578	578	0	0	163	741
40628-UNT9	297	277	19	0	145	442
40628-UNT9a	352	352	0	0	0	352
40628-W	247	247	0	0	137	384
40628-X	420	0	420	0	102	522
40628-Y	40	40	0	0	104	144
40628-Z	19	19	0	0	297	316
40631	1,018	24	0	994	1,326	2,344
40631-A	252	252	0	0	45	297
40631-C	141	141	0	0	55	196
40631-D	17	17	0	0	95	112
40631-J	319	319	0	0	397	716
40631-J1	94	94	0	0	0	94
40631-J2	139	139	0	0	9	148
40631-J3	52	52	0	0	82	134
40631-O	123	123	0	0	0	123
40631-P	183	183	0	0	0	183
40630	70	0	0	70	9,613	9,683
40629	73	0	0	73	7,108	7,181
40628-UNT 12	0	0	0	0	79	79
Total	12,627	6,972	1,335	4,319	41,662	54,289

6.3.2.6.1 Ephemeral Stream Segments

Thirty-eight (38) ephemeral channels were identified within the McCourtney Run watershed (Table 6-35 and Figures 6-2a, 6-2c and 6-2d). The total length of ephemeral stream segments was 6,972 linear feet, ranging from 17 to 707 linear feet. Functions provided included sources of fine sediment and organic nutrient conveyance to higher order receiving streams downslope. Anthropogenic disturbances included road and railroad drainage diversions and relic channels from grazing activity. Ephemeral channels lacked bed and bank morphology and unstable substrate materials.

6.3.2.6.2 Intermittent Stream Segments

Eleven (11) intermittent channels exist within the McCourtney Run watershed (Table 6-35 and Figures 6-2a, 6-2c and 6-2d). Total length of intermittent stream segments was 1,335 linear feet. Streams ranged from 15 to 420 linear feet. Riparian vegetation consisted of hickories (*Carya spp.*), red maple (*Acer rubrum*), spicebush (*Lindera benzoin*), and multiflora rose (*Rosa multiflora*). Stream 40628-X originated on a railroad fill. Riparian vegetation on this system consisted of crown vetch (*Coronilla varia*), thistles (*Carduus spp.*), and multiflora rose (*Rosa multiflora*). This channel exhibited eroded banks and increased sedimentation resulting from adjacent unconsolidated fill material.

6.3.2.6.3 Perennial Stream Segments

Nine (9) perennial stream segments were identified within the project area, totaling 4,319 linear feet (Table 6-35 and Figures 6-2a, 6-2c and 6-2d).

McCourtney Run and its tributaries were classified as High-Quality Warm Water Fisheries (HQ-WWF) under 25 PA Code Chapter 93. However, stream 40629 was designated as an EV stream. Norman Hollow Road abutted the channel for nearly its entire length, and several residences and outbuildings were located within the floodplain. The lower portion of the stream flowed through active pasture. Livestock had unrestricted access to the stream channel.

Streams 40631 and 40628 UNT 4 originate on the south valley slopes of McCourtney Run and flow north through the project boundary. Both streams flowed through culverts beneath the NS railroad embankment. The headwaters of these streams were forested headwaters and formed extensive channel networks that confluence into well-developed perennial channels. Riparian area width was greater than 25 feet and vegetation consisted of red maple (*Acer rubrum*), black walnut (*Juglans nigra*), white oak (*Quercus alba*), wingstem (*Verbisina alternifolia*), and multiflora rose (*Rosa multiflora*). Substrates were comprised of cobble and gravel.

Residential land use and developed riparian areas existed along stream 40630. Substrates consisted of gravel and sand and riparian vegetation consisted of maintained lawn and wingstem (*Verbisina alternifolia*).

Stream 40628-K flowed under SR 0018 via a culvert and into a hayfield, where it was artificially straightened and incised to its confluence. Riparian vegetation consisted of multiflora rose (*Rosa multiflora*), wingstem (*Verbisina alternifolia*), and American sycamore (*Platanus occidentalis*).

6.3.2.6.4 Macroinvertebrate and Physiochemical Data

The four (4) Appendix B stations (MCR 1, MCR 2, MCR 3, and MCR 4) located within the McCourtney Run watershed (Figure 6-3, Tables 6-36, 6-37 and 6-38, and Appendix A) were sampled during 2 sample events (Spring 2009, Fall 2009, 2010 Round 1, and 2010 Round 2).

Table 6-36. Habitat Data Summary for McCourtney Run Watershed Appendix B Sampling Stations (2010 Round 1 - 2010 Round 2)

Season		2010 Round 1				2010 Round 2			
Site ID		MCR 1	MCR 2	MCR 3	MCR 4	MCR 1	MCR 2	MCR 3	MCR 4
Wetted Width (feet)		24.0	9.9	12.5	2.9	12.7	10.5	9.4	2.3
Channel Width (feet)		24.0	9.9	13.0	7.1	24.7	16.4	12.5	2.3
Stream Depth (feet)		0.53	0.44	0.58	0.17	0.68	1.03	0.36	0.30
Canopy Cover		0%	0%	20%	<5%	0%	0%	5%	5%
Habitat Assessment and Score (and % of maximum possible score)		139/240 58%	136/240 57%	167/240 70%	131/240 55%	118/240 49%	123/240 51%	155/240 65%	89/240 37%
Substrate Characteristics	Bedrock	0%	0%	0%	0%	0%	0%	0%	0%
	Boulder	10%	10%	5%	0%	5%	15%	5%	5%
	Cobble	20%	20%	25%	20%	30%	30%	15%	20%
	Gravel	35%	30%	35%	45%	35%	35%	40%	60%
	Sand	10%	20%	20%	10%	15%	15%	25%	5%
	Silt	20%	15%	10%	20%	15%	5%	10%	5%
	Clay	5%	5%	5%	5%	0%	0%	5%	5%
	% Coarse Particulate Organic Matter (CPOM)	<5%	10%	5%	0%	5%	15%	60%	5%
	% Fine Particulate Organic Matter (FPOM)	0%	0%	0%	0%	0%	0%	0%	5%

Table 6-37. In situPhysiochemical Data Summary for McCourtney Run Watershed (PA Appendix B) Sampling Stations (2010 Round 1- 2010 Round 2)

Season	2010 Round 1				2010 Round 2			
Site ID	MCR 1	MCR 2	MCR 3	MCR 4	MCR 1	MCR 2	MCR 3	MCR 4
Water Temperature (^{o}C)	8.2	11.3	13.3	8.1	2.2	2.5	5.2	3.5
Dissolved Oxygen (ppm)	5.80	7.00	12.80	12.70	13.71	13.37	11.80	13.00
Conductivity (uS)	215.0	217.0	208.0	241.0	166.0	169.0	404.0	235.0
pH (standard units)	7.89	8.13	8.72	8.27	7.92	8.01	7.34	7.71

Table 6-38. Macroinvertebrate Data Summary for McCourtney Run Watershed Appendix B Sampling Stations (2010 Round 1 - 2010 Round 2)

Taxa Richness	23	17	19	16	9	21	21	12
% EPT	10.17	7.82	9.86	0.43	4.21	27.62	22.66	22.58
% Ephemeroptera	4.24	4.47	5.63	0.43	1.05	3.31	6.90	0.54
No. Intolerant Taxa	11	10	8	7	6	11	9	7
% Tolerant Organisms	84.75	83.24	90.61	92.74	94.21	76.24	74.38	76.34
PADEP Tolerance Value	4.39	4.29	4.89	4.94	3.89	4.19	5.14	4.17
% Contribution Dominant Family	52.54	71.51	65.26	48.72	92.63	62.98	56.16	73.66
% Chironomidae	52.54	71.51	65.26	48.72	92.63	62.98	56.16	73.66
% Scrapers and Predators	38.14	13.41	24.41	45.73	2.11	6.08	20.20	5.38
% Filterers and Gatherers	60.17	84.36	74.18	52.14	93.68	70.17	63.55	74.19
Shannon-Wiener Diversity Index	1.8145	1.2636	1.4852	1.4700	0.4037	1.5404	1.8009	0.9002
Equitability Index	0.5787	0.4460	0.5044	0.5302	0.1837	0.5060	0.5915	0.3623

6.3.2.7 South Fork Tenmile Creek (40293)

Northwest of Golden Oaks Road (SR 0018), the South Fork Tenmile Creek watershed (40293) drains approximately 127,000 acres (Table 6-39 and Figures 6-2a and 6-2d). South Fork Tenmile Creek flowed west to east, parallel to SR 0021. Elevations within the South Fork Tenmile Creek watershed ranged from approximately 1,000 feet to 1,500 feet.

South Fork Tenmile Creek and its tributaries were designated as High-Quality Warm Water Fisheries (HQ-WWF) under 25 PA Code Chapter 93.

Table 6-39. South Fork Tenmile Creek and Associated Tributaries Stream Lengths in Linear Feet by Classification

Reach Name	Inside Project Boundary	Classification Within Project Boundary			Outside of Project Area	Total
		Ephemeral	Intermittent	Perennial		
40293	420	0	0	420	34,412	34,832
40293-UNT1	76	15	61	0	1,388	1,464
Total	496	15	61	420	35,800	36,296

6.3.2.7.1 Ephemeral Channels

One (1) ephemeral channel (40293-UNT 1) exists along South Fork Tenmile Creek (Table 6-39 and Figures 6-2a and 6-2d). This channel conveyed flow into the mainstem via a culvert under SR 0021. Riparian vegetation consisted of old field habitat dominated by seasonal grasses. Substrates consisted of mineral soil and gravel from the roadway. Lacking stable substrate, and sustainable stream flow ephemeral channels offer limited habitat to aquatic organisms. Functions were provided by these channels including; sources of fine sediment transport of surface flows and organic nutrient conveyance to higher order receiving streams downslope.

6.3.2.7.2 Intermittent Channels

One (1) intermittent stream channel (40293-UNT1), encompassing 61 linear feet, was identified within the project area (Table 6-39 and Figures 6-2a and 6-2d). Riparian vegetation consisted of old field habitat dominated by grass. Substrates consisted of sand and gravel. This channel was formed from storm water runoff from the adjacent roadway.

6.3.2.7.3 Perennial Channels

One (1) perennial stream approximately 420 feet in length, exists in the South Fork Tenmile Creek watershed (Table 6-39 and Figures 6-2a and 6-2d). The left bank was comprised of old field habitat, while the right bank was forested. Old field flora was comprised raspberry (*Rubus sp*.) and wingstem (*Verbisina alternifolia*). Forested area consisted of black willow (*Salix nigra*), red maple (*Acer rubrum*), black cherry (*Prunus serotina*), American sycamore (*Platanus occidentalis*), and box elder (*Acer negundo*). The mainstem stream channel was deeply incised with eroded vertical banks.

6.3.2.7.4 Macroinvertebrate and Physiochemical Data

The 3 standard RBP stations (40293 SFTM 1:S, 40293 SFTM 2:S, 40293 SFTM 3:S) located within the South Fork Tenmile watershed were sampled once in the Spring of 2011 (Tables 6-40 through Table 6-42 and Appendix A).

Table 6-40. In situ Physiochemical Data Summary for South Fork Tenmile Watershed (Standard RBP) Sampling Stations (Spring 2011)

Season	Spring 2011		
Site ID	40293 SFTM 1:S	40293 SFTM 2:S	40293 SFTM 3:S
Water Temperature (^{o}C)	1.1	0.6	3.9
Dissolved Oxygen (ppm)	13.42	13.84	15.50
Conductivity (uS)	259.0	254.0	267.0
pH (standard units)	7.84	7.80	8.61

Table 6-41. Habitat Data Summary for South Fork Tenmile Creek Watershed Macroinvertebrate (Standard RBP) Sampling Stations (Spring 2011)

Season		Spring 2011		
Site ID		40293 SFTM 1:S	40293 SFTM 2:S	40293 SFTM 3:S
Wetted Width (feet)		22.0	30.0	42.3
Channel Width (feet)		30.0	35.0	45.0
Stream Depth (feet)		1.23	1.38	1.85
Canopy Cover		25%	40%	20%
Habitat Assessment and Score (and % of maximum possible score)		125/240 52%	135/240 56%	100/240 42%
Substrate Characteristics	Bedrock	0%	0%	0%
	Boulder	0%	0%	0%
	Cobble	15%	15%	5%
	Gravel	15%	15%	15%
	Sand	25%	25%	25%
	Silt	45%	45%	35%
	Clay	0%	0%	15%
	% Coarse Particulate Organic Matter (CPOM)	25%	10%	0%
	% Fine Particulate Organic Matter (FPOM)	0%	0%	0%

Table 6-42. Summary Statistics for RBP Points Collected at Southfork Tenmile Creek

	Spring 2011		
Metric	40293 SFTM 1 S	40293 SFTM 2 S	40293 SFTM 3 S
Taxa Richness	15	18	19
% EPT	7.80	22.54	10.20
% Ephemeroptera	2.44	2.89	2.91
No. Intolerant Taxa	8	8	11
% Tolerant Organisms	91.70	79.77	91.26
PADEP Tolerance Value	4.67	5.28	4.42
% Contribution Dominant Family	75.12	69.36	86.89
% Chironomidae	75.12	69.36	86.89
% Scrapers and Predators	4.39	7.51	5.34
% Filterers and Gatherers	88.78	73.99	91.75
Shannon-Wiener Diversity Index	1.1127	1.3555	0.7451
Equitability Index	0.4109	0.4690	0.2531

6.3.3 Impacts to Project Area Streams

This section of the 404 Permit Application addresses proposed impacts to project area stream resources and the associated loss or degradation of function. Efforts undertaken during the design process to minimize or avoid resource impacts are presented in Section 4.0 of this document.

The project area and the proposed facilities have been divided into 30 impact areas based on activities and or proposed structures (Table 4-1, Figure 4-1 and Figures 4-1-1a through 4-8-9). Impacted streams are also presented by stream invert profiles to represent the limits and type of impacts (Figure 4-9 sheets 1 through 13). Impacts vary both spatially and in degree of impact. Stream impacts are presented from a watershed and sub-watershed perspective with reference to the aforementioned impacts areas for spatial reference within the project area.

Proposed activities will impact a total jurisdictional stream length of 53,575 linear feet (not including stream channel loss associated with Hoge Run relocation) and approximately 3.9 acres of existing in-stream habitat across all stream classifications throughout the project area. Proposed impacts to jurisdictional ephemeral channels comprise 18,456 linear feet and approximately 0.4 acres of habitat area, proposed jurisdictional intermittent channel impacts comprise 5,218 linear feet and approximately 0.2 acres of in-stream aquatic habitat area and jurisdictional perennial stream impacts comprise 29,901 linear feet containing approximately 3.3 acres of in-stream aquatic habitat area. Compensatory Mitigation for proposed impacts is summarized in Section 7.0 and explained in detail within Appendix F of this document.

Project area streams provide a variety of functions within the ecosystem including:

> BIOLOGICAL – The habitat, organisms and aquatic ecosystem component of streams, primarily intermittent and perennial.
>
> PHYSIOCHEMICAL – Includes baseline physical influences that streams provide to the environment including water temperature and oxygen regulation, organics and nutrient cycling.
>
> GEOMORPHOLOGICAL – The functions related to erosional forces, transport of woody material and sediments that produce channel bedforms, erosional and depositional features and stream patterns.
>
> HYDRAULIC – The conveyance of runoff and groundwater within the channel, over the floodplains and through substrates.
>
> HYDROLOGY – The transport of waters from the larger watershed area to the channels and receiving streams, rivers, etc.

Ephemeral streams within the project area generally were located along existing roadway and NS railroad embankment, or within the uppermost, high gradient portions of the major stream systems located throughout the project area. All of the channels varied in width from several

inches to several feet in depth. The defined bed and banks typically contained mineral soil substrates without obvious sediment sorting or gradation and often included rooted woody stem or herbaceous vegetation interspersed with accumulated detritus and organic materials. Within these settings, vegetation varied considerably from steep-sloped, bare-earth conditions along fill embankments to, organic-rich, mature forested valley slopes. For the most part, ephemeral streams in the project area provide several distinct functions:

- Conveyance of surface runoff in response to precipitation events to receiving streams downslope;
- Conveyance and initial processing of accumulated organic materials from riparian vegetation (if present);
- Initiation of the organic nutrient cycling process within the stream system;
- Source of and conveyance of fine grained soil particles, minerals, etc. to receiving streams downslope; and
- Transportation of terrestrial organisms to higher level consumers.

Ephemeral streams within transportation corridors were situated on poorly-vegetated embankments slopes and cut slopes or at the outfalls of storm drainage pipes, culverts, and conveyance channels. They tended to be incised and overly deep compared to their width.

6.3.3.1 Garner Run (40643) Watershed - Stream Functional Impacts Overview

The Garner Run watershed includes portions of the following impact areas and corresponding facilities:

- Impact Area 14 Shaft Pad Stockpile Areas
- Impact Area 15 Batch Weigh Facility
- Impact Area 17 Fresh Water Impoundment
- Impact Area 19 Fresh Water Supply System
- Impact Areas 21, 23 and 25 Railroad Track Siding Area

6.3.3.1.1 UNT 40645-Q of (Garner Run) - Impact Area #14 (Shaft Pad Stockpile Areas)

One hundred seventy (170) linear feet of cut and 34 linear feet of fill are proposed associated with access road construction (Figure 4-4-2). The remaining ephemeral channel upslope of the impacted area will remain un-impacted and runoff diverted away to prevent erosion.

All biological and hydrological functions are expected to be lost within the impacted reach. The accumulation and breakdown of detritus that typically occurs within ephemeral segments will no longer exist, and upslope runoff is proposed to be diverted away from the lower reaches of this channel. Forest habitat is proposed for removal, which will result in decreased detritus input and less canopy shade over the channel likely resulting in an increase in water temperature.

6.3.3.1.2 UNT 40644 and 40644-A of (Garner Run) - Impact Area #15 (Batch Weigh Facility)

Impact Area 15 consists predominantly of forest land with compartments of old field and residential land use.

Perennial Stream Segments. To facilitate maintenance and operation of the Batch Weigh Facility, the existing NS railroad embankment will need to be widened (Figure 4-5-1). This activity will require earthwork and the fill within portions of 40644 and 40644-A and extension of an existing 72 inch corrugated metal pipe (CMP). These activities include 198 linear feet of impact in the perennial segment of 40644 comprising approximately 0.05 acres of instream impacts to potential habitat. The existing 72 inch CMP that conveys flow downstream provides poor epifaunal substrate for macroinvertebrates when compared to natural substrate. Pipe and fill obscures the channel from direct sunlight and reduces vegetative production. Upstream migration of aquatic organisms is reduced or impeded due to a lack of adequate resting habitat, and increased flow velocity.

Intermittent Stream Segments. Proposed activity on 40644-A would impact 426 linear feet of intermittent channel, comprising approximately 0.01 acres of instream impacts to potential habitat. The proposed widening of the NS railroad embankment to accommodate the Batch Weigh facility would completely fill this intermittent segment eliminating all function within it.

6.3.3.1.3 UNT 40649 and UNT 40645 (of Garner Run) - Impact Area #17 (Freshwater Impoundment)

Freshwater Impoundment design is proposed to include one sediment pond, sediment pond embankment, and impoundment embankment (Figures 4-6-1a and 4-6-1b). The embankment construction will take place entirely within the 40649 watershed. Access to the site for construction and maintenance will require the construction of an access road that will impact portions of the 40545 watershed.

UNT 40649

Tributary 40649 is predominantly contained within the proposed freshwater impoundment facility. The impacted stream channels across all classifications within the watershed of 40649 total 11,562 linear feet and 0.6 acres. Included within this impact area are 34 ephemeral channel segments totaling 5,294 linear feet, 10 intermittent channels totaling 1,454 linear feet, and 9 perennial segments totaling 4,813 linear feet.

Ephemeral Segments. Within the project area are 34 ephemeral channel segments totaling 5,294 linear feet, or 0.1 acres. Land use along these stream segments was predominantly forested and the riparian area was estimated to be greater than 25 feet for each channel. Average stream width was 1.125 feet and average bank height was 1 foot. Substrates consisted of mineral soil and clay with very little or no sediment sorting. These streams were high gradient, forested headwater that remained dry for the majority of the year.

Functionally, these ephemeral stream segments were important for transporting coarse particulate organic matter (CPOM) into the food web. Detritus, leaf matter and rooted plants collect in the relatively narrow, shallow channels throughout the year, and were washed downstream during storm events and heavy precipitation providing seasonal nutrient input.

The proposed activity will fill this valley with water eliminating the functions.

Intermittent Segments. Included within this project area are 10 intermittent channels totaling 1,454 linear feet and 0.1 acres in area. Land use along the intermittent segments was predominantly forested consisting of mature hardwoods and the riparian area was estimated to be greater than 25 feet for each channel. Stream gradient was high with an average width of 1.96 feet and an average bank height of 1.1 feet. Substrate consisted of clay bottoms with some cobble, gravel and sand deposition.

Functionally these intermittent segments served as the initial point of surface intersection for groundwater sources of flow. Potential nutrient conveyance downstream and habitat for aquatic organisms were present within all of these segments. Proposed activities would eliminate all functions within these channel segments as the streams are filled with earth and water.

Perennial Segments. Included within the project area are 9 perennial segments totaling 4,813 linear feet, and 0.4 acres that would be impacted. Land use along the perennial segments was predominantly forested with the exception of a residence at the confluence with Garner Run, where the riparian consists of a maintained lawn. Average width of the perennial segments was 2.3 feet and average bank height was 1.56 feet. Substrate was dominated by cobble and gravel in these generally high gradient reaches.

Perennial segments have the capacity, in the absence of impairment, to sustain diverse communities of aquatic organisms. Functionally these perennial segments provide a sustained point of surface intersection for groundwater sources of flow. The floodplains and pools of perennial reaches served as depositional zones for the retention of sediments transported from upstream channel segments. All of the potential functions of these perennial stream segments will be lost as the proposed activity will fill the channels.

UNT 40645

An access road and process water supply pipeline that would encroach on tributary 40645 is proposed to facilitate construction of, and maintenance to, the Freshwater Impoundment Facility. The Freshwater Supply Pipeline is proposed to convey fresh water from a proposed pump house and water intake at South Fork Tenmile Creek to the Freshwater Impoundment Facility. Total impacts proposed with the 40645 watershed are 414 linear feet.

Ephemeral Segments. Included within the project area are 3 ephemeral segments totaling 286 linear feet and 0.006 acres in area. Land use along these stream segments was classified as 100% forested and the riparian buffer zone was estimated to be greater than twenty five 25 feet for each channel. Average stream width was 1.125 feet and average bank height was 1 foot. Substrates consisted of mineral soil and clay with very little or no sediment sorting. These segments were high gradient, forested headwater habitats that remained dry for the majority of the year.

All three ephemeral channels contain a total of 218 linear feet of cut on the upslope side of the proposed road creating altered channels for runoff. Stream 40645-R contains 68 linear feet of fill on the downslope side of the proposed road, reducing the effective area of runoff conveyance. Proposed activities within these channels would result in the removal of accumulated detritus and rooted vegetation within the ephemeral channels. Nutrient conveyance function would be interrupted until this material is replaced naturally.

Intermittent Segments. Included within the project area is one intermittent segment totaling 128 linear feet and 0.003 acres in area. Stream 40645-U, an intermittent segment, occurs on a forested hillside and within a regularly maintained residential riparian area. Stream 40645-U contains substrate dominated by clay and organic soil, and the channel width averaged 1 foot in width. Proposed activities would result in the partial fill and excavation of the upper portion of the stream for access road and runoff conveyance channel construction. As a result, some seasonal groundwater flows and sediment and detritus inputs to the remaining portion of 40645-U and the receiving stream, main stem 40645, would be interrupted.

Perennial Segments. There were no Perennial segments of Stream 40645 within the project area.

6.3.3.1.4 UNT 40645 -Impact Area #19 - (Freshwater Supply System, Water Line)

The conveyance of flow to the Freshwater Impoundment Facility from South Fork Tenmile Creek, and from the Freshwater Impoundment Facility to related operational areas requires the installation of a waterline and ancillary infrastructure. In the lower perennial segment of stream 40645, proposed water line installation would result in 20 linear feet, or 0.0014 acres, of temporary stream impacts (Figure 4-6-3B.1). Two 10 inch lines are proposed to cross underneath 40645 between S.R. 0018 and Garner Run mainstem. Vegetation consisted of maintained lawn and common roadside herbaceous.

All functions within the impacted reach, except for the conveyance of water, are expected to be temporarily impacted during waterline installation. Grade control, substrate, bed and bank formation and sinuosity would be altered due to proposed activities. Aquatic organisms within the reach would also be impacted during excavation.

After construction, physical stream characteristics are expected to return to pre-construction conditions.

6.3.3.1.5 UNT 40643-O and 40643-G -Impact Area #21 (Railroad Siding)

Operations at the Batch Weigh Facilities require existing NS railroad embankment to be widened to facilitate the movement of equipment and personnel around the site. Impact Area #21 occurs along an existing NS railroad embankment. Old field habitat is dominant, consisting of low successional tree species and shrub understory.

Proposed activities would eliminate portions of ephemeral channels 40643-O and 40643-G, due to necessary cut excavation of the slope (Figure 4-8-1). These channels conveyed runoff from existing rail side ditches through CMPs and into Garner Run mainstem. The areal extent of cut and consequent stream impacts to Stream 40643-O would be 92 linear feet, or 103.5 square feet. The areal extent of cut and consequent stream impacts to Stream 40643-G will be 136 linear feet, or 0.0059 acres.

All functions are expected to be lost, as the stream channels will be eliminated, and the NS railroad embankment expansion would occur at their former location. Accumulation and breakdown of detritus within the ephemeral channels of 40643-O and 40643-G will no longer occur upstream of the rail siding.

6.3.3.1.6 UNT 40646 - Impact Area #23 (Railroad Siding)

Proposed rail siding expansion would necessitate a 38 foot extension of an existing 60 inch CMP to convey perennial stream 40646 through the NS Railroad embankment (Figure 4-8-3). Old field habitat was dominant, consisting of successional tree species and shrub understory. This was a disturbed area with pioneer species community composition. Proposed impacts to perennial Stream 40646 are 51 linear feet, or 0.0029 acres. Collection channel CC-R23 is proposed to convey runoff from the NS Railroad embankment to Stream 40646 at the upstream limit of the impacted area.

CMP extension is expected to result in the loss of biological function due to the exclusion from sunlight and removal of natural substrate. Reduced capacity for macroinvertebrate colonization and increased impedance to upstream migration of aquatic organisms is expected to result from proposed activities.

6.3.3.1.7 UNT 40643-B - Impact Area #25 (Railroad Siding)

Old field habitat was dominant, consisting of low canopy intermediate trees and shrubs. The present vegetative habitat and detritus input would be displaced or destroyed, but is expected to return over time to pre-construction conditions.

Ephemeral Segment. A soil stockpile area located on the ridge top adjacent to Stream 40643-B would be accessed by a proposed temporary access road. This road is proposed to cross Stream 40643-B within the ephemeral segment of the stream near the top of the channel (Figure 4-8-5). A temporary stream crossing structure consisting of two 36-inch CMPs would fill 30 linear feet, and 1.5 acres in area with AASHTO No. 1 fill rock (Figure 4-8-5). Upon stockpile completion, the structure would be removed and the channel restored.

Biological and hydrological functions of the stream are expected to be minimally impacted from the temporary crossing. Detritus input may decrease due to the necessity to clear vegetation for construction site preparation.

Intermittent Segment. No impacts to intermittent streams are proposed.

Perennial Segments. Operations at the Batch Weigh Facilities require the existing NS Railroad embankment to be widened to facilitate the movement of equipment and personnel around the site. The perennial segment of Stream 40643-B was conveyed through the existing NS Railroad embankment via a 36 inch CMP (Figure 4-8-5). Proposed activities would extend the existing culvert and fill creating impact over a total of 84 linear feet, or 189 square feet. Collection channels (CC-RR20 and CC-RR21A) are also proposed to convey runoff from NS Railroad embankment to 40643-B.

CMP extension is expected to result in reduced biological function due to the exclusion from sunlight and removal of natural substrate. Reduced capacity for macroinvertebrate colonization and increased impedance to upstream migration of aquatic organisms is expected to result from proposed activities.

6.3.3.2 Grinage Run (40647) Watershed Overview

The Grinage Run watershed includes portions of the following impact areas and associated facilities:

- Impact Area #22 Soil Stockpile Sediment Pond P5
- Impact Area #23 Railroad Siding South of Batch Weigh Facility

6.3.3.2.1 UNT 40647-T1j1 and 40647-T1j3- Impact Area #22 (Sediment Pond P5)

Sediment Pond P5 and associated collection channels are proposed to control runoff and prevent or decrease sediment transport to lower reaches of the stream network. Soil stockpile #9 is proposed to be constructed north of ephemeral 40647-T1j of Grinage Run on a ridge top that separates Grinage Run from Garner Run (Figure 4-8-2). Sediment Pond P5 is proposed as an erosion and sedimentation control for this facility.

Two (2) ephemeral stream segments would be impacted by the proposed activities. Segments of ephemeral 40647-T1j1 (34 linear feet, or 38 square feet) and ephemeral 40647-T1j3 (60 linear feet, or 0.0024 acres) are proposed to be filled to create Sediment Pond P5.

All functions are expected to be lost within the filled ephemeral channels. Detritus accumulation and breakdown would no longer occur due to the lack of a channel. The stream is expected to maintain functions in the adjacent reaches, but the total area of ephemeral channel would be decreased as a result of proposed construction.

6.3.3.2.2 UNT 40647- Impact Area #23 (Railroad Track Siding)

Proposed rail siding expansion will necessitate a 68-foot extension of an existing 144-inch CMP to convey perennial 40647 through the NS Railroad embankment (Figure 4-8-3). Proposed impacts to perennial 40647 would be 85 linear feet, and 0.0215 acres in area. Collection channel CC-R25 is proposed to convey runoff from NS Railroad embankment to perennial 40647 at the upstream limit of the impacted area.

CMP extension is expected to result in reduced biological function due to the exclusion from sunlight and removal of natural substrate. Reduced capacity for macroinvertebrate colonization and increased impedance to upstream migration of aquatic organisms is expected to result from proposed activities.

6.3.3.3 Hargus Creek (40627) Watershed Overview

The Hargus Creek watershed includes portions of the following impact areas and corresponding facilities:

Impact Area #19a Freshwater Supply System Waterline

The conveyance of flow to the Freshwater Impoundment Facility from South Fork Tenmile Creek and, from the Freshwater Impoundment Facility to related operational areas, requires the installation of a water line and related infrastructure. In the lower perennial segment of 40627-E, proposed water line installation would result in 15 linear feet, or 0.0012 acres in area, of temporary stream impacts. One (1) water line is proposed to cross Stream 40627-E north of S.R. 0018 within the right-of-way of the roadway (Figure 4-6-3b.1). The flow of Stream 40627-E would be temporarily diverted with a bypass pump (Figure 4-6-3b.2) to facilitate the line

installation to a minimum distance of 36 inches from top of concrete pipe casing to stream bottom.

Impact Area #19a occurs within a residential area adjacent to S.R.0018. Vegetation consisted predominantly of maintained lawn and common roadside vegetation.

All functions within the impacted reach, except for the conveyance of water, are expected to be temporarily impacted during waterline installation. Grade control, substrate, bed and bank formation, and sinuosity would be temporarily altered due to proposed activities. Aquatic organisms and their habitat within the impacted reach would be displaced or lost in the excavation.

Following waterline installation and subsequent channel restoration and revegetation, the physical and biological stream characteristics are expected to return to pre-construction conditions as natural substrates are redeposited and benthic organisms recolonize the area. Studies suggest that recolonization of utility line crossing areas generally occurs rapidly following installation (Reid et. al. 2002).

6.3.3.4 Hoge Run (40632) and Tributaries Watershed Overview

The Hoge Run watershed includes portions of the following impact areas and corresponding facilities:

- Impact Area #1-#10- Slope Entry Facilities
- Impact Area #11- Haul Road and Maintenance Facilities
- Impact Area #20B- Coal Refuse Disposal Area #3

6.3.3.4.1 40632 Hoge Run Impact Area #1- (Slope Entry Facilities)

Proposed Slope Entry Facilities construction requires the relocation of 5,731 linear feet, or 0.99 acres, of the perennial mainstem of Hoge Run. 4,924 linear feet of the stream would be relocated to the north side of the stream valley. Due to the alteration of the existing stream channel, 807 linear feet of stream length would be lost to the placement of fill (Figures 4-1-1a and 4-1-1B). Two concrete box culverts are proposed to facilitate the construction of access roads to the Slope Pad Facilities. Both culverts are 14 feet wide by 9 feet high, with varying lengths to accommodate predicted traffic volumes. Total length of perennial stream flowing through the concrete box culvert would be 171 linear feet.

Stream relocation would incorporate natural stream channel design elements and best management practices to construct a hydrologically balanced channel that is expected to maintain biological and hydrological function over time. When compared to the existing perennial segment of Hoge Run, the constructed relocation reach of the stream is expected to

provide an improvement in habitat quality and quantity, as well as an improvement in the macroinvertebrate community.

6.3.3.4.2 Impact Area #2- (Slope Entry Facilities)

The proposed relocation of Hoge Run would result in the disconnection of existing tributaries on the south side of the stream. Construction of the Proposed Slope Entry would impact portions of these streams (Figure 4-1-2). Within Impact Area #2, 86 linear feet, or 0.0063 acres, of Stream 40632-N would be lost to fill or cut activities. The intermittent channel of Stream 40632-O would incur 18 linear feet, or 0.011 acres of loss to fill or cut activities. The ephemeral segment would lose 57 linear feet, or 64 square feet. Ephemeral segments of Streams 40632-N2 and 40632-N are proposed to lose 22 linear feet, 0.0006 acres in area, and 34 linear feet, less than 0.001 of an acre in area, respectively.

Aquatic organisms within the proposed fill would be displaced or lost in excavation during construction. All biological functions are expected to be lost within the filled stream channels. Hydrology and runoff is proposed to be conveyed to main stem Hoge Run via diversion channel DV-05 or to Sediment Trap #7, via collection channel CC-16.

6.3.3.4.3 Impact Area #3- (Slope Entry Facilities)

The proposed relocation of Hoge Run would result in the disconnection of existing tributaries on the north side of the stream. Proposed Slope Entry Facilities construction would impact portions of these streams as the result of fill or cut activities (Figure 4-1-3). Due to the necessary grading and excavation for pad construction, several channels within Impact Area #3 would be eliminated through the placement of fill.

Perennial stream 40632-M is conveyed under Hoge Run Road (T-105), via an existing culvert to the confluence with main stem Hoge Run. Proposed activities would replace this culvert to match the expansion of the roadway. A rock outflow apron is proposed at the downstream end of the proposed culvert that would discharge into the proposed Hoge Run relocation. Proposed collection channels would cross Stream 40632-M at the upstream limit of the proposed culvert, where a proposed sump would be constructed. Total proposed impacts to Stream 40632-M would be 210 linear feet, or 0.145 acres, of perennial stream.

Filled portions of the stream channel, totaling 138 linear feet, would result in the loss of all biological and hydrologic functions. Aquatic organisms within the proposed fill would be displaced at the time of construction. CMP extension is expected to result in reduced biological function due to the exclusion from sunlight and removal of natural substrate. Although hydrologic connection is expected to remain intact, the total length of perennial channel will be reduced.

Impacts to ephemeral channels 40632-Q and 40632-R would result in the loss of 171 linear feet, or 0.0041 acres; and 160 linear feet, or 0.0044 acres, respectively. These impacts would result

from the proposed construction of Topsoil Stockpile #10, associated access road, and sediment pond and collection channels. All functions within these impacted channels would be replaced by proposed collection channels that would convey runoff.

6.3.3.4.4 Impact Area #4- (Slope Entry Facilities)

One (1) ephemeral and 1 perennial stream segment are proposed to be impacted within Impact Area #4 (Figure 4-1-4). Proposed slope pad construction would fill the entire ephemeral segment of 40632-EE for an impact of 142 linear feet, or 0.0037 acres. Perennial channel 40632-L would be impacted along 336 linear feet, or 0.027 acres in area. Proposed collection channel CC-1-01 would convey the runoff from upslope as well as the remaining perennial flow of 40632-L to sediment pond #1.

All biological and hydrological functions within Stream 40632-EE and hydrological functions within Stream 40632-L are expected to be replaced by collection channel CC-1-01. Aquatic organisms within the impacted reach of Streams 40632-L and 40632-EE will be displaced as a result of proposed activities. Some recolonization may occur within the collection channel, but overall quantity and quality of aquatic habitat is expected to decrease as a result of perennial channel loss to cut and fill.

6.3.3.4.5 UNTs 40632-K Perennial and 40632-K12 Intermittent Impact Area #5- (Slope Entry Facilities)

Proposed construction of soil stockpile access road, Hoge Run Road (T-105) widening, Sediment Trap #14, and Hoge Run Relocation channel would result in impacts to Streams 40632-K and 40632-K12 intermittent stream channels. Impacts to Stream 40632-K12 would include 189 linear feet, or 0.009 acres in area. Proposed impacts to Stream 40632-K would be 382 linear feet, or 0.0263 acres in area (Figure 4-1-5).

All biological and hydrological functions within Stream 40632-K12 are expected to be lost as a result of fill activities. CMP extension is expected to result in reduced biological function due to the exclusion from sunlight and removal of natural substrate. Reduced capacity for macroinvertebrate colonization and increased impedance to upstream migration of aquatic organisms is expected to result from the proposed activities. Exclusion from direct sunlight is expected to prohibit vegetative growth thereby reducing detritus input and cover habitat. Temperature regulation may be affected by exclusion from direct sunlight and is expected to reduce surface water temperature seasonally. The collection channel sump and rock outflow aprons are expected to be conducive to re-colonization post-construction. Although hydrologic connection is expected to remain intact, the total length of perennial channel will be reduced within 40632-K.

6.3.3.4.6 UNT 40632-J and Tributaries and Ephemeral Tributaries 40632-L1, 40632-L1a and 40632-L1a1 Impact Area #6- (Raw Coal Pad and Associated Access Roads)

Perennial stream 40632-J and associated tributaries are proposed to be impacted by construction of the raw coal pad and associated access roads (Figure 4-1-6). The entire stream network is proposed to be lost as a result of cut and fill activities. Proposed perennial impacts would be 2,083 linear feet, or 0.287 acres in area; while total ephemeral impacts would be 664 linear feet, or 0.022 acres.

All functions are expected to be lost to cut and fill activities within the entire stream network of Stream 40632-J. Proposed collection channels around the Raw Coal Pad are expected to convey runoff away from the facility; thereby replacing, to some degree, hydrologic function that would be performed by the stream network. All aquatic organisms within the impacted watershed would be displaced.

Ephemeral stream channels 40632-L1, 40632-L1a, and 40632-L1a1 are proposed to be impacted by construction of the collection channel CC-2-01 and the raw coal pad access road. Proposed impacts would include 20 linear feet, or 0.0005 acres in area, of Stream 40632-L1; 17 linear feet, or 0.0004 acres, of Stream 40632-L1a; and 159 linear feet, or 0.0041 acres, of Stream 40632-L1a1.

All functions are expected to be lost as a result of fill activities in the section of Stream 40632-L1a1.

6.3.3.4.7 UNT 40632-FF Impact Area #7- (Slope Entry Facilities)

The entire length of ephemeral channel 40632-FF would be lost to cut and fill activities associated with the proposed slope pad construction (Figure 4-1-7). Impacts would total 264 linear feet, and 0.0068 acres of stream channel would result. Proposed collection channel CC-HR13 is expected to convey runoff to Hoge Run from upslope in the absence of Stream 40632-FF.

All functions of Stream 40632-FF are expected to be replaced by the proposed collection channel CC-HR13, including runoff conveyance and detritus accumulation.

6.3.3.4.8 Impact Area #8- (Slope Entry Facilities)

Proposed construction of the slope pad and relocation of Hoge Run (Figure 4-1-8) would result in impacts to perennial channel 40633. A total of 199 linear feet, or 0.0091 acres, would be impacted. A proposed twin-culvert configuration and a rock outflow apron are proposed upstream of the relocated Hoge Run. A total of 117 linear feet of the stream would be filled to construct the Slope Pad and roadway widening, and 82 linear feet would be cut to construct a collection channel sump stream relocation channel and rock outflow apron.

Filled portions of the stream channel, totaling 117 linear feet, are expected to lose all biological and hydrologic functions. Aquatic organisms within the proposed fill would be displaced or lost during construction. CMP extension is expected to result in reduced biological function due to the exclusion from sunlight and removal of natural substrate. Reduced capacity for macroinvertebrate colonization and increased impedance to upstream migration of aquatic organisms is expected to result from proposed activities.

6.3.3.4.9 Impact Area #9- (Slope Entry Facilities – Sediment Pond #3)

Proposed construction of Sediment Pond #3 and adjacent Slope Pad will impact 5 stream channels in Impact Area #9. Impacts to perennial stream 40632-I would be 517 linear feet, or 0.039 acres. Proposed activities would result in cut and fill loss for the entire impacted channel segment.

The intermittent segment of Stream 40632-BB is proposed to be impacted by cut and fill for sediment pond grading, for an impact of 80 linear feet, or 0.0041 acres. The intermittent segment of Stream 40632-DD is proposed to be filled, resulting in the loss of 39 linear feet, and 0.002 acres in area.

Ephemeral channel 40632-CC is proposed to be impacted by cut activities to accommodate Sediment Pond #3. Proposed impacts would be 191 linear feet, or 0.0049 acres in area. Ephemeral segment 40632-I1 would be impacted by cut activities, resulting in the loss of 26 linear feet, or 0.0007 acres. There are 278 linear feet, or 0.0072 acres of impact proposed to the ephemeral segment of 40632-DD due to cut and fill activities associated with sediment pond grading. A loss of 158 linear feet, or 0.0041 acres, of ephemeral segment 40632-BB is proposed as a result of cut activities for sediment pond grading. (Figure 4-1-9)

All aquatic organisms within the impacted reaches are expected to be displaced or lost in excavation. Hydrology from the impacted channels is expected to be diverted to the proposed Sediment Pond #6, which discharges into main stem Hoge Run.

6.3.3.4.10 Impact Area #10- (Sediment Pond #6)

Proposed construction of Sediment Pond #6 will impact ephemeral and intermittent segments of 40632-AAA and a perennial segment of Hoge Run mainstem (Figure 4-1-10).

The perennial segment of Hoge Run (40632) will be crossed by an access road to Sediment Pond #6 via a 14 foot wide by 16 foot long box culvert, for a total impact length of 108 linear feet. The area proposed to be occupied by the box culvert will later be incorporated into the proposed sediment basin associated with Coal Refuse Disposal Area R-3 as project development occurs. Please refer to section 6.3.3.4.12 impact area 20B for details of the additional impacts.

The aquatic community within the impacted segment of Hoge Run will be temporarily displaced by proposed culvert construction. By design, the box culvert is expected to retain natural

substrate and flow regime. The retention of these features is expected to allow for re-colonization shortly after proposed construction.

The intermittent segment of Stream 40632-AAA is proposed to be impacted by fill for sediment pond grading. Impacts to 106 linear feet are proposed to the remaining length of intermittent channel, maintaining the current point of confluence with Hoge Run.

All aquatic organisms within the impacted intermittent reaches are expected to be displaced or lost in excavation. Hydrology from the impacted channels is expected to be diverted to the proposed Sediment Pond #6, which discharges into main stem Hoge Run.

Ephemeral channel 40632-AAA is proposed to be impacted by cut and fill activities to accommodate Sediment Pond #6. Proposed impacts would be 81 linear feet.

The ephemeral channels offer limited habitat for the biological community, but any potential habitat will be lost in cut and fill. Runoff from upslope will be conveyed by proposed collection channels.

6.3.3.4.11 Impact Area #11 Haul Road and Maintenance Facilities

Proposed construction of Coal Refuse Disposal Area #3 would require the construction of a Refuse Haul Road and Maintenance Facility Pad. A fill embankment is proposed to be placed north of the conveyor and maintenance facility (Figure 4-2). Proposed activities would impact 6 stream segments within Impact Area #11.

Intermittent segment 40632-H1 has proposed impacts totaling 104 linear feet, or 0.007 acres. A proposed collection channel would cross the stream channel to convey flow to sediment pond #6. The remaining length of channel 40632-H1 will be filled.

Impacts to ephemeral channels 40632-GG, 40632-H, 40632-H1, 40632-H1a, 40632-H2 and 40632-H5 would result in the loss of 695 linear feet, or 0.0179 acres of stream channel.

All aquatic organisms within the impacted reaches are expected to be displaced or destroyed. Hydrology from the impacted channels is expected to be diverted to the proposed Sediment Pond #6, which discharges into main stem Hoge Run. Biological functions within the impacted reaches are expected to be lost as a result of cut and fill activities, as well as the flow diversion. The sediment pond is expected to replace some of the lost habitat and substrate providing potential for macroinvertebrate colonization.

6.3.3.4.12 Hoge Run 40632 and Tributaries - Impact Area #20B (Coal Refuse Disposal Area R-3)

The headwaters of Hoge Run 40632, downstream to the confluence with UNT 40632-AA are predominantly contained within the proposed project area. The proposed impacts within the CRDA R-3 project area total 23,682 linear feet. Impacts would include 57 ephemeral channel

segments totaling 8,827 linear feet, 17 intermittent channels totaling 1,962 linear feet, and 9 perennial segments totaling 12,893 linear feet (Figures 4-7-2A – 4-7-2D).

Ephemeral Segments. Fifty-five (57) ephemeral channel segments would be impacted, resulting in a total linear distance of 8,827 linear feet. Land use along these stream segments was classified as forested 49% and agriculture 14%. Gradient is characterized as high. Substrates consisted of mineral soil and clay with very little or no sediment grading. These forested headwater habitats that typically remain dry for the majority of the year.

Functionally, these ephemeral stream segments are important for transporting CPOM into the food web. Detritus and rooted plants collect in the weakly-formed channels throughout the year and are washed downstream during storm events, providing seasonal nutrient input. The nutrient cycle depends on this collection and subsequent conversion of plant biomass into useable organic nutrients.

Within CRDA R-3, all ephemeral streams are proposed to be covered with fill material. The filling of these stream segments would result in a loss of stream functions. Impacts to ephemeral streams would total 0.227 acre.

Intermittent Segments. Sixteen (17) intermittent channel segments would be impacted, totaling 1,962 linear feet. Gradient is characterized as high and bank height averaged 1.32 feet. Dominant substrate within the sample reaches were gravel and sand.

The 17 intermittent streams associated with the CRDA R-3 project area are the uppermost in the network that can support aquatic life forms and are therefore typically dominated by primary consumers that convert plant biomass into energy for growth and propagation. The seasonal expression of groundwater in these locations begins the process of substrate sorting and sediment transport downstream. The movement and sorting of substrate particles creates interstitial spaces for aquatic life to utilize for forage, cover, and spawning. The transportation of bed load from upper reaches to lower reaches facilitates balance throughout the watershed. Proposed filling of these segments would result in the loss of functions to 1,962 linear feet of stream, or 0.102 acre.

Perennial Segments. Eight (9) perennial stream segments, totaling 12,893 linear feet, are situated in the project area. Riparian areas consisted predominantly of forest with old field compartments. Substrates were dominated by cobble, gravel and sand. Bank slopes ranged from 1:2 to 1:3.5 with an average bank height of 1.8 feet. Stream width averaged 3.4 feet within the impacted areas.

In the absence of impairment, perennial stream segments can support diverse communities of aquatic organisms. Typically, perennial segments are comprised of well-developed stream channels with viable epifaunal substrate and sustained flow throughout the year. The perennial segments of CRDA 3 convey nutrients, substrate, flow, and aquatic life to lower portions of the Hoge Run watershed.

The proposed activity would eliminate all functions within the perennial channels as characterized above. Impacts would include 12,893 linear feet, or 1.61 acres.

6.3.3.5 House Run (40628) and Tributaries Watershed Overview

The House Run watershed includes portions of the following impact areas and corresponding facilities:

- Impact Area #12- Clean Coal Stockpile Area
- Impact Area #13- Shaft Facilities and Adjacent Supply Yard
- Impact Area #19- Freshwater Supply System Water Line
- Impact Area #20A- Coal Refuse Disposal Area CR-1B

6.3.3.5.1 UNT 40635-L and Associated Tributaries-Impact Area #12 (Clean Coal Stockpile Area)

A Clean Coal Stockpile and associated facilities are proposed to be constructed within the 40635-L watershed. Impacts to this stream network would include 3,186 linear feet, or 0.2163 acres, of perennial stream; 589 linear feet, or 0.031 acres, of intermittent stream; and 735 linear feet, or 0.019 acres, of ephemeral stream (Figure 4-3-1).

One 38 linear-foot cut segment is proposed on Stream 40635-L5a to accommodate proposed pad grades, and another 70 linear-foot cut segment is proposed for perennial Stream 40635-L to accommodate Sediment Pond #4. Additional impacts to Stream 40635-L are proposed downstream of S.R. 3020 below the Clean Coal Stockpile Facility. A proposed culvert extension of 21 linear feet, as well as 2 proposed rock outlet aprons encompassing a total of 44 linear feet, would result in additional impacts (Figure 4-3-2).

Stream functions within the mainstem and tributaries of 40635-L are expected to be lost as a result of the proposed impacts upstream of S.R. 3020. The contributing hydrology, runoff and drainage from surrounding slopes would be intercepted by collection channels and conveyed around the site to Sediment Pond #4 reducing or eliminating hydrologic contributions to the remaining segment of 40635-L. These impacts would also displace or eliminate the aquatic organisms and organic nutrient contributions to the remainder of 40635-L and the receiving stream system. CMP extension is expected to result in reduced biological function due to the exclusion from sunlight and removal of natural substrate.

6.3.3.5.2 UNT-Impact Area #13 (Shaft Facilities and Adjacent Supply Yard)

A 16 x 6.5 foot concrete box culvert is proposed to facilitate the access road crossing of House Run between the Pittsburgh Seam Shaft Pad Yard and the Supply Yard. Construction of a freshwater supply waterline is being proposed to take place concurrently with culvert construction to minimize duration and magnitude of stream disturbance. Total impacts include 92 linear feet, or 8,818 square feet, of a perennial segment of House Run (Figure 4-4-1).

Initially, the construction phase of these proposed impacts would displace or destroy all aquatic organisms within the affected reach. Hydrological functions would be maintained throughout construction using a stream bypass pump around system (Figure 4-6-3B.2). Over time biological re-colonization and natural sediment transport are expected to return the reach to pre-construction conditions.

6.3.3.5.3 UNT 40636 and tributaries - Impact Area #20A (Coal Refuse Disposal Area CR-1B)

Tributary 40636 to House Run is predominantly contained within the project area. Proposed impacts for all stream channels, across all classifications, would total 6,450 linear feet, or 95% of the total length of 40636 and its associated tributaries. Impacts within the project area would include: 18 ephemeral channels totaling 2,432 linear feet, or 0.0628 acres; 2 intermittent channels totaling 116 linear feet, or 0.006 acres; and 5 perennial segments totaling 3,902 linear feet, or 0.4424 acres (Figure 4-7-1).

Final design plans for the coal refuse site include the construction of a sediment basin at the proposed toe of the coal refuse embankment slope. This activity would require 217 linear feet of cut within the existing stream channel. This basin would receive groundwater discharged from within the valley that contains the coal refuse disposal site with controlled and monitored outflow into the remaining perennial segment of Tributary 40636. A sediment pond embankment immediately downstream of the sediment pond would require the placement of fill material within 210 linear feet of the channel. Beginning at the upstream side of the sediment basin, coal refuse material and associated earthen cap would fill the entire valley of Stream 40636, resulting in 6,023 linear feet of impact to stream resources.

Forested land use is dominant throughout the watershed; however, recent timber harvest activity has disrupted natural drainage patterns, and increased erosion and sedimentation transport and deposition. The resulting changes in substrate and biological carrying capacity are likely to degrade the biological integrity of the watershed.

Ephemeral Segments. Eighteen (18) ephemeral channel segments would be impacted in the project area, totaling 2,432 linear feet. Land use along these stream segments was classified as 100% forested, and the riparian buffer zone was estimated to be greater than 25 feet for each channel. Gradient is characterized as high, average stream width was estimated at 1.125 feet and average bank height was 1 foot. Substrates consisted of mineral soil and clay, with little or no sediment sorting. The segments are high gradient, forested headwater habitats that remain dry for the majority of the year.

Functionally, these ephemeral stream segments are important for transporting CPOM into the food web. Detritus and rooted plants collect in the weakly formed channels throughout the year, and are washed downstream during storm events. The nutrient cycle depends on this collection and subsequent conversion of plant biomass into useable organic nutrients.

Within the project area, all ephemeral streams are proposed to be covered with fill material. The filling of these stream segments would result in a total loss of functions. Impacts to ephemeral streams would total 0.0628 acres.

Intermittent Segments. Two (2) intermittent channel segments would be impacted, for a total linear distance of 116 feet. Land use along these stream segments was classified as 100% forested, and the riparian buffer zone was estimated to be greater than 25 feet for each channel. Gradient is characterized as high, and average channel width was 2.25 feet with average bank height of 2.25 feet. Dominant substrates were gravel and sands.

Two (2) intermittent streams exist within the project area. These segments are the uppermost in the system that can support aquatic life forms and are therefore typically dominated by primary consumers that convert plant biomass into energy for growth and propagation. The seasonal emergence of groundwater in these locations begins the process of substrate sorting and sediment transport. The movement and sorting of particles creates interstitial spaces for aquatic life to utilize for forage, cover and spawning.

The proposed filling of these segments would result in a total loss of functions within these segments totaling 0.006 acres.

Perennial Segments. Five (5) perennial stream segments in the project area would be impacted, totaling 3,902 feet. Land use along these stream segments was classified as 100% forested and the riparian buffer zone was estimated to be greater than 25 feet for each channel. Gradient is characterized as high, average bank height was estimated at 3.4 feet, and average channel width was 3.5 feet. Dominant substrate consisted of gravel and sand.

Perennial stream segments occur below the water table for the majority of the year providing, in the absence of disturbance, the potential to support diverse aquatic and semi aquatic biological communities. The perennial segments of Stream 40636 to House Run contribute stream flow, convey substrate, dissolved and suspended biological materials, and provide macroinvertebrate colonization or re-colonization potential to main stem House Run.

The proposed activity would result in the filling of all these perennial stream channels for their entire lengths, with the exception of Stream 40636. The extent of impacts on Stream 40636 begins 430 feet upstream of its confluence with House Run. Of the total stream length of 3,360 linear feet, perennial and intermittent, 2,635 feet would be impacted. Proposed fill of these stream segments would result in a loss of functions to 0.4424 acres.

6.3.3.6 McCourtney Run (40628) and Tributaries Watershed Overview

The McCourtney Run watershed includes portions of the following impact areas and corresponding facilities:

- Impact Area #19- Freshwater Supply System Water Line
- Impact Areas - #16, #26, #27, #28 and #29 Rail Siding and Batch Weigh Facility

6.3.3.6.1 UNTs 40628-A (19.f), 40628-J (19.d), 40628-Q (19.g), 40628-K (19.b), 40629 (19.c), 40628-UNT 11 (19.h) and 40630 (19.e) Impact Area #19 (b, c, d, e, f, g, h), -(Freshwater Supply System, Water Line)

The proposed Freshwater Supply System waterline installation would occur within the ROW of S.R. 0018, necessitating 7 stream crossings within the McCourtney Run watershed (Figure 4-6-3B.1). These crossings would impact 3 perennial segments, 2 intermittent segments, and 2 ephemeral segments. These impacts would be confined to 15 linear feet in each occurrence, and post construction channel restoration is proposed. Total proposed impacts by classification are as follows:

All functions within the impacted reaches, except for the conveyance of water, are expected to be temporarily lost during the construction of proposed waterline crossings. Stream flow will be maintained by a bypass pump on the site (Figure 4-6-3B.2). Following waterline installation and subsequent channel restoration and revegetation, the physical and biological stream characteristics are expected to return to pre-construction conditions as natural substrates are redeposited and benthic organisms recolonize the area. Studies suggest that recolonization of utility line crossing areas generally occurs rapidly following installation (Reid et. al. 2002).

Physical stream characteristics are expected to be returned to pre-construction conditions following construction. The re-construction of these 15 linear-foot sections of stream channel utilizing natural stream channel design methodologies would re-establish hydrologic function and the potential for aquatic organism colonization and biological diversity.

6.3.3.6.2 UNT 40628-I of McCourtney and Tributaries Impact Area #16- (Batch Weigh Facility)

Impacts to the perennial segment of Stream 40628-I would result from the proposed Batch Weigh Facility pad and access road construction (Figure 4-5-2). Adjacent to the existing NS Railroad embankment, pad installation would result in the placement of fill in 412 linear feet of perennial stream, or a 0.142 acre area.

Aquatic organisms within the filled perennial segment of Stream 40628-I would be displaced or lost during construction. Aquatic organisms are expected to re-colonize downstream of the impacted reach. Surface runoff would be conveyed by diversion channel DV-RR02 or the railroad embankment adjacent collection channel.

The proposed Batch Weigh Access Road and rail siding construction would also impact Streams 40628-I2 and 40628-I2a. Both ephemeral channels would be lost in excavation, totaling 153 linear feet, or 0.040 acres in area; and 54 linear feet, or 0.014 acres, respectively. Stream 40628-I2a is proposed to be excavated in its entirety.

Diversion channel DV-RR02 is proposed to cross the ephemeral potion of Stream 40628-I, as well as ephemeral channel 40628-I2, to intercept upslope drainage and prevent it from entering the Batch Weigh Facility. These channel crossings would result in cut impacts totaling 26 linear feet, 0.0007 acres in area; and 20 linear feet, 0.040 acres in area, respectively.

All aquatic organisms within the filled perennial segment of Stream 40628-I would be displaced or lost during construction. Furthermore, all stream segments upslope of the existing NS Railroad embankment are to be cut off from the lower reaches of Stream 40628-I. Surface runoff would be conveyed by diversion channel DV-RR02 or the railroad embankment adjacent collection channel.

6.3.3.6.3 UNTs 40628-H, 40628-H3 and 40628-H4 Impact Area #26- (Railroad Siding)

Proposed expansion of the existing NS Railroad embankment would result in impacts to the perennial segment of Stream 40628-H, the entire length of ephemeral stream 40628-H3, and intermittent stream 40628-H4 (Figure 4-8-6). Intermittent stream 40628-H4 is proposed to be excavated, resulting in impacts to 88 linear feet, and 0.004 acres in area. Ephemeral channel 40628-H3 is proposed to be excavated, impacting 76 linear feet, and 0.0020 acres in area. An existing culvert conveys the flow of 40628-H beneath the NS Railroad embankment. Proposed activities would relocate this culvert to accommodate the widened embankment over the channel. Impacts to 40628-H would consist of 59 linear feet, and 0.0034 acres in area of additional culvert and fill.

All functions are expected to be lost within the filled channels of Streams 40628-H3 and 40628-H4. Aquatic organisms present in these channels will be displaced or lost during excavation. Runoff would be conveyed to Stream 40628-H via proposed collection channels.

Perennial channel segment 40628-H would continue to convey hydrology downstream through a proposed culvert extension. CMP relocation is expected to result in reduced biological function due to the exclusion from sunlight and removal of natural substrate. Reduced capacity for macroinvertebrate colonization and increased impedance to upstream migration of aquatic organisms is expected to result from proposed activities.

6.3.3.6.4 UNTs 40628-UNT 4, 40628-UNT 6, and 40628-UNT 10, 40631 and 40631-P Impact Area #27- (Railroad Siding)

Proposed railroad siding expansion would require culvert extension within 4 of the 5 channels affected in Impact Area #27, and the complete fill of 1 stream channel (Figure 4-8-7). Ephemeral stream channel 40631-P would be completely filled and replaced by proposed collection channel CC-RR12. Total impacts to Stream 40631-P would be 183 linear feet, or 0.0047 acres.

Ephemeral stream 40631-P conveys runoff from the existing NS Railroad embankment into a perennial segment of Stream 40631. All function for this channel would be lost as the result of the placement of fill.

A 70 linear-foot section of ephemeral 40628-UNT 10, or 0.0037-acre section, would be impacted by fill placement from the proposed construction of Sediment Pond P1. The fill placed within this channel would result in the loss of function and alteration of runoff drainage pattern.

Impacts to the remaining perennial and ephemeral channels would result from culvert extensions to facilitate the rail side expansion. A total of 185 linear feet of perennial impacts; and 181 linear feet of ephemeral impacts are proposed as a result of proposed culvert extensions and fill placements for 40631,40628-UNT4, 40628-UNT6, and 40628-UNT10.

Perennial channel segments 40628-UNT 4 and 40631 would continue to convey hydrology downstream through a proposed culvert extension. CMP extension is expected to result in reduced biological function due to the exclusion from sunlight and removal of natural substrate. Reduced capacity for macroinvertebrate colonization and increased impedance to upstream migration of aquatic organisms is expected to result from proposed activities. Exclusion from direct sunlight is expected to prohibit vegetative growth, thereby reducing detritus input and cover habitat. Temperature regulation may be affected as an additional 185 linear feet of stream would be excluded from direct sunlight

6.3.3.6.5 UNTs 40628-W, 40628 UNT 9 and 40628 UNT 9a Impact Area #28- (Railroad Siding)

Proposed expansion of the NS Railroad embankment at impact area #28 would result in impacts to 530 linear feet, or 0.0136 acre, of ephemeral stream; and 12 linear feet, or 0.001 acre, of intermittent stream (Figure 4-8-8).

The entire ephemeral segment of Stream 40628-W, totaling 172 linear feet, or 0.0044 acre, is proposed to be impacted by cut activities associated with the site grading operations. The ephemeral segment of Stream 40628-UNT 9 is proposed to be impacted by cut activities during site grading operations. Total impacts would include 230 linear feet, or 0.0059 acre, of ephemeral channel. A portion of Stream 40628-UNT 9a is proposed to be impacted by cut activities associated with site grading operations. Total impacts to 40628-UNT 9a would include 128 linear feet, or 0.0033 acre, of ephemeral channel. Undisturbed portions of Stream 40628-UNT 9a would drain into proposed collection channel CC-RR2, and would then be conveyed to Stream 40628-EE east of Impact Area #28.

Ephemeral portions of 40628-W are proposed to be replaced by CC-RR3 and runoff will be conveyed to 40628-UNT 9 at proposed culvert 418+25. Ephemeral portions of 40628-UNT 9 are proposed to be replaced by collection channel CC-RR2 and conveyed to 40628-X in Impact Area #19 downstream.

The intermittent segment of 40628-UNT 9 is proposed to receive runoff from the proposed collection channel CC-RR3 via culvert 418+25. A rock outlet apron is proposed at the outflow of the culvert to dissipate discharge energy and prevent excessive erosion downstream. Impacts from the proposed apron would total 12 linear feet, or 0.0001 acre.

6.3.3.6.6 UNTs 40628-EE and 40628-X Impact Area #29 - (Railroad Siding)

Proposed impacts to the ephemeral stream 40628-EE would include 20 linear feet. A rock outlet apron is proposed on the ephemeral segment of 40628-EE at the outflow of proposed culvert 406+00 to dissipate discharge energy and prevent excessive erosion downstream from collection channel CC-RR-2. Additional impacts would include 35 linear feet, or 0.0009 acre, of impact on intermittent stream 40628-X to accommodate the construction of an energy dissipation basin and associated cut to maintain positive drainage (Figure 4-8-9).

These impacts would initially displace or eliminate aquatic organisms within the reach. Over time aquatic organisms are expected to recolonize the impacted stream segments.

6.3.3.7 South Fork Tenmile Creek (40293) and Tributaries Watershed Overview

The South Fork Tenmile Creek watershed includes portions of the following impact areas and corresponding facilities:

Impact Area #18 - Freshwater Supply System Intake Structure

The proposed Freshwater Supply System is designed to withdraw water resources from South Fork Tenmile Creek at Impact Area #18. The installation of a low flow weir and water intake pump house would impact 46 linear feet, or 0.0275 acres (Figure 4-6-2).

The proposed construction of a concrete weir is expected to result in temporary loss of functional habitat, initially displacing or eliminating aquatic organisms in the impacted area. Post construction, the reach is expected return to preconstruction conditions and to support a diverse aquatic community.

6.4 WETLANDS AND AQUATIC FUNCTIONS

This section of the Section 404 permit application describes existing wetland resources and aquatic functions and values wetland resources identified within the proposed Foundation Mine project area. Also detailed are potential unavoidable impacts to wetland resources that are anticipated to result from construction of the preferred development alternatives. This section also establishes baseline conditions that will be used to determine potential impacts (debits) and compensatory mitigation (credits) requirements. A discussion of measures taken by the applicant to avoid and minimize impacts to aquatic resources is presented in Section 4.0. The alternatives analysis for the proposed project is discussed in Section 5.0.

6.4.1 Wetland Identification Methodology

Prior to field investigations, the applicant's consultant reviewed existing project area soils and wetland data to identify potential and previously identified wetland areas that exist within the project boundary. Resources such as USDA-NRCS-mapped hydric soils units, USGS 7.5-Minute Series Quadrangle mapping and U.S. Fish and Wildlife Service's (USFWS) National Wetland Inventory (NWI) mapping were included in the preliminary assessments.

6.4.1.1 Published Information Review

FMLLC consulted the United States Department of Agriculture, Natural Resource Conservation Service's (USDA-NRCS) on-line digital National Cooperative Soil Survey (NCSS) and USDA-NRCS Soil Survey of Greene County to identify previously-mapped wetlands and soil series, phases and characteristics for each identified wetland. Based on this review, twenty-one (21) distinct soil groups were identified within the proposed Foundation Mine Project area. The soils information is summarized in Table 6-43 and the geographical extents of mapped soils are presented on Figure 6-5.

Of the twenty-one (21) soil types present within the proposed Foundation Mine Project area eleven (11) are classified as soils containing hydric inclusions, including Newark silt loam (Nw), Fluvaquents Loamy (Fa), and Huntington silt loam (Hu), Dormont silt loams (DoB, DoC), Guernsey silt loams (GeB, GeC), Library silty clay loam (LbC) and Weikert-Culleoka complex (WeB, WeC, and WeD). No hydric soils were identified within the Project Area.

In addition to a review of the Greene County and online soil survey data, locations of potential wetlands were determined through a review of NWI mapping (Figure 6-4).

Table 6-43. Summary of Published Soils Information

Project Area Soils Within the Foundation 404 Permit Boundary						
Soil Symbol (Unit)	**Soil Unit Name**	**Soil Type**	**Acres of Soil in Project Area**	**Hydric Component**	**Associated Hydric Landform**	**Hydric Soil - Pct. of Soil Unit**
CaB	Culleoka silt loam, 3 to 8 percent slopes	Consociation	12	-	-	-
CaC	Culleoka silt loam, 8 to 15 percent slopes	Consociation	25	-	-	-
CaD	Culleoka silt loam, 15 to 25 percent slopes	Consociation	2	-	-	-
CkB	Culleoka-Upshur complex, 3 to 8 percent slopes	Complex	4	-	-	-
CkC	Culleoka-Upshur complex, 8 to 15	Complex	9	-	-	-
CkD	Culleoka-Upshur complex, 15 to 25 percent slopes	Complex	9	-	-	-
DaB	Dekalb channery loam, 3 to 8 percent slopes	Consociation	1	-	-	-
DoB	Dormont silt loam, 3 to 8 percent slopes	Consociation	23	Wet areas	Depressions, swales	Unk
DoC	Dormont silt loam, 8 to 15 percent slopes	Consociation	33	Wet areas	Depressions, swales	Unk
DoD	Dormont silt loam, 15 to 25 percent slopes	Consociation	183	-	-	-
DtD	Dormont-Culleoka silt loams, 15 to 25 percent slopes	Complex	228	-	-	-
DtF	Dormont-Culleoka silt loams, 25 to 50 percent slopes	Complex	1,082	-	-	-
Fa	Fluvaquents, loamy	Consociation	45	Poorly-drained areas; Melvin	Bottom lands, flood plains	10%
GeB	Guernsey silt loam, 3 to 8 percent slopes	Consociation	12	Wet areas	Depressions, drainageways	Unk
GeC	Guernsey silt loam, 8 to 15 percent slopes	Consociation	21	Wet areas	Depressions, drainageways	Unk
Hu	Huntington silt loam	Consociation	25	Wet areas; Atkins	Bottom lands, flood plains	10%
LbC	Library silty clay loam, 8 to 15 percent slopes	Consociation	5	Purdy	Drainageways, depressions	Unk
Nw	Newark silt loam	Consociation	66	Poorly-drained areas; Atkins; Brinkerton	Bottom lands, flood plains, depressions	5%
WeB	Weikert-Culleoka complex, 3 to 8 percent slopes	Complex	18	Seep spots(*)	Seepy areas	Unk
WeC	Weikert-Culleoka complex, 8 to 15 percent slopes	Complex	42	Seep spots(*)	Seepy areas	Unk
WeD	Weikert-Culleoka complex, 15 to 25 percent slopes	Complex	22	Seep spots(*)	Seepy areas	Unk

Note: Components marked with an asterisk (*) may need a soil scientist's verification.
For dashed (-) items in the Pct. Of Soil Unit column, the percentage is not available.
Soils with percentages were obtained from the online Soil Data Mart; all others from the original 1983 soil survey.

Source: USDA-NRCS National Cooperative Soil Survey and Soil Survey of Greene and Washington Counties.

Four (4) NWI wetland systems were also identified as outlined on Table 6-44.

Table 6-44. NWI Wetland Comparison for Foundation Mine Project Area

NWI Wetland	NWI Wetland Acres	Corresponding Identified Wetland	Actual Delineated Wetland Acres
PUBHh	0.130	Wetland A	0.028
PEM1C	0.505	Wetland H	0.380
PUBHh	0.415	Wetland I	0.236
PUBHh	0.149	Wetland J	0.043
4 total	1.199	4 field delineated	0.687

The NWI wetlands are identified as PUBHh (0.130 acre), PEM1C (0.505 acre), PUBHh (0.415 acre) and PUBHh (0.149 acre). Prior to field reconnaissance, the locations of these features were added to resource mapping for verification in the field. All four of the wetland systems indicated in the NWI were observed to be present at the time of field investigations although the wetland acres and Cowardin classification of field delineated wetlands differed from the NWI wetland information. Table 6-44 provides a comparison of the NWI identified wetland systems to the delineated wetlands within the project area (Figure 6-4).

6.4.1.2 Field Investigation

Following the background data review, potential wetland areas within the project area were identified by FMLLC on the following dates:

- November 6, 2006
- June 17, 2010
- May 12th and 20th, 2008
- June 27th-28th, 2008
- December 16th, 2008
- January 5-6th, 2011
- April 18-29th, 2011
- May 11th,2011
- May 31, 2001
- June 1, 2011
- June 30, 2011

Wetland delineations were conducted utilizing the *Corps of Engineers Wetland Delineation Manual (Technical Report Y-87-1)* (Environmental Laboratory, 1987) and the *Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont Region* (USACE, 2010). The functions and values of each wetland were assessed utilizing the *Highway Methodology Workbook Supplement, Wetland Functions and Values, A Descriptive Approach (NAEEP-360-1-30a)(USACE 1999)* (USACE, 1995). Wetland areas were categorized according to the *Classification of Wetlands and Deep Water Habitats in the United States* (Cowardin, Carter, Golet, and LaRoe, 1979).

The USACE (Federal Register, 1982) and the U.S. Environmental Protection Agency (USEPA) (Federal Register, 1980) jointly define wetlands as:

> "Those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions."

Wetland Hydrology. Wetland hydrology includes all hydrologic characteristics of areas that are periodically inundated or have soils saturated to the surface at some time during the growing season. Indicators of wetland hydrology may be obtained from historical data such as stream gauge records, aerial photography, or flood insurance maps. Field indicators of wetland hydrology typically include inundation, soil saturation, oxidized rhizospheres, water marks, drift lines, sediment deposits, water-stained leaves, surface scoured areas, drainage patterns, and morphological plant adaptations.

Hydric Soil. Wetland soils are either hydric soils or soils possessing characteristics which are associated with anaerobic conditions. Hydric soils are soils that are saturated or flooded long enough during the growing season to develop anaerobic conditions in the A-horizon. Soil colors that are gleyed (bluish to neutral gray), have a low chroma (chroma is defined as the intensity of gray), and low chroma with mottles. If a soil is gleyed, has a matrix Chroma of 1 (very dark gray-black) without mottles, or a matrix Chroma of 2 (gray) with mottles, it is considered a hydric soil. The presence of hydric soil is determined by comparing soil colors of recovered samples to the Munsell Soil Color Charts (Kollmorgen Instruments Corp, 1990).

Hydrophytic Vegetation. Wetland vegetation is defined as macrophytic plant life growing in water, soil, or on a substrate that is at least periodically deficient in oxygen as a result of excessive water content (Federal Interagency Committee for Wetland Delineation, 1989). Hydrophytic species generally have the adaptations and the ability to grow, effectively compete, and/or persist in anaerobic soil conditions.

Determining Wetland Boundaries. Boundary delineation was accomplished by using a sharpshooter shovel and a soil probe to extract samples of soil at a depth of approximately 16-18 inches at areas along the wetland's edge. Changes in topography and hydrology were used to locate potential sampling areas. The soil was examined for wetland characteristics (mottles and/or low matrix chroma, gleying, iron and manganese concretions). The soil samples were then compared to the Munsell soil color charts for categorization. Hydrological indicators were also noted at each sample location. Depending on the results of the initial soil sample, additional samples were collected (either closer to wetland or upland habitat) until the boundary was determined. The wetland boundaries surveyed to an accuracy of +/- three (3) feet using a Trimble GeoXT Global Positioning System (GPS) unit. The surveyed boundary information was then downloaded to project GIS mapping, and potential impacts to wetlands that may result from the project were analyzed.

6.4.1.3 USACE Jurisdictional Determination Field Views

To ensure agency concurrence with wetland field delineations and stream identifications for the project area, a project-wide jurisdictional determination (JD) field view was conducted with representatives of the USACE and PADEP. The JD was conducted on May 10-13th, 24th, 31st and June 1st. Wetland data forms, mapping, and photographs were distributed to the agency representatives. An administrative record of the JD field view is contained within Appendix A of this document.

6.4.2 Wetland Investigation Results

A total of forty-five (45) wetland systems, comprising 2.676 acres were identified within the project area. The location of identified project area wetlands is illustrated on Figure 6-4. A summary of pertinent information for wetlands is presented in Table 6-45.

Of the forty-five (45) identified wetlands, twenty-four (24) totaling 1.278 acres were located within the Hoge Run watershed, seven (7) totaling 0.726 acre were found in Garner Run watershed, six (6) totaling 0.178 acre were identified in House Run watershed, five (5) totaling 0.280 acre were delineated in McCourtney Run watershed, two (2) were identified in Grinage Run totaling 0.194 acre, and one (1) was delineated in South Fork Tenmile Creek watershed totaling 0.020 acre. The vast majority of the identified wetlands (40 of 45) were less than 0.150 acres in size and many (30 out of 45) were classified as 100% Palustrine Emergent (PEM) wetlands or were comprised of 80% (44 out of 45) or more of the PEM or POW Cowardin wetland classification.

Herbaceous vegetation communities and composition among wetlands were similar. Dominant vegetation was comprised of combinations of common, native, facultative and obligate wetland species including: agrimony (*Agrimonia parviflora*), soft rush (*Juncus effusus*), jewelweed (*Impatiens capensis*), spotted joe-pye weed (*Eupatoriadelphus fistulosus*), reed-canary grass (*Phalaris arundinacea*), rice-cut grass (*Leersia oryzoides*), sensitive fern (*Onoclea sensibilis*), common boneset (*Eupatorium perfoilatum*), and various unidentified sedges (*Carex spp*.). The scrub shrub community consisted of sapling black willow (*Salix nigra*), spice bush (*Lindera benzoin*), and multiflora rose (*Rosa multiflora*). Tree species identified included black willow (*Salix nigra*), American sycamore (*Platanus occidentalis*), and box elder (*Acer negundo*).

Table 6-45. Wetland Resources Within the 404 Project Boundary

Wetland Name	Cowardin Wetland Classification	Acres	Preliminary Nexus to Waterway	USACE Jurisdictional* or Isolated
Garner Run				
F-1	85% PEM/15% PSS	0.003	Adjacent 40644	Jurisdictional
F-2	90% PEM/10% PSS	0.042	Abutting 40643	Jurisdictional
F-71	100% PEM	0.012	Headwaters of 40645-X	Jurisdictional
Wetland H	90% POW/10% PFO	0.380	Along 40644	Jurisdictional
Wetland I	10% PEM/5% PFO/85% POW	0.236	Along 40644	Jurisdictional
Wetland J	100% PEM	0.043	Along 40644	Jurisdictional
40649-W1	85% PEM/15% PSS	0.010	Adjacent 40649-R4	Jurisdictional
Subtotal		**0.726**		
Grinage Run				
GRI-1	100% PEM	0.070	None	Isolated
Wetland M	70% PEM/25% PSS/5% PFO	0.124	Abutting 40648-L1	Jurisdictional
Subtotal		**0.194**		
Hoge Run				
F-16	100% PEM	0.009	Abutting 40632-R3	Jurisdictional
F-19	100% PEM	0.025	None	Isolated
F-20	100% PEM	0.067	Abutting 40632-H	Jurisdictional
F-21	100% PEM	0.052	None	Isolated
F-22	100% PEM	0.012	None	Isolated
F-23	100% PEM	0.009	Adjacent 40632-HH	Jurisdictional
F-28	100% PEM	0.009	None	Isolated
F-41	90% PEM/10% PSS	0.055	Abutting 40634	Jurisdictional
F-44	100% PEM	0.004	Adjacent 40632-BB	Jurisdictional
F-45	95% PEM/5% PSS	0.024	None	Isolated
F-52	100% PEM	0.040	Adjacent 40632	Jurisdictional
F-62	95% PEM/5% PSS	0.006	None	Isolated
F-70	100% PEM	0.001	Headwaters 40632-M1a	Jurisdictional
HOG-3	100% PEM	0.168	None	Isolated
HOGE-1	100% PEM	0.128	None	Isolated
HOGE-2	100% PEM	0.256	None	Isolated
R3-1	100% PEM	0.020	Abutting 40632-P	Jurisdictional
R3-2	100% PEM	0.022	Abutting 40632-P	Jurisdictional
R3-3	100% PEM	0.006	Adjacent 40632-P	Jurisdictional
R3-4	90% PEM/10% PFO	0.146	Abutting 40632-P	Jurisdictional
R3-5	100%PEM	0.084	Abutting 40632	Jurisdictional
Wetland A	100% PEM	0.028	None	Isolated
Wetland B	100% PEM	0.001	None	Isolated
Wetland C	95% PEM/5% PSS	0.106	None	Isolated
Subtotal		**1.278**		

Table 6-45. Wetland Resources Within the 404 Project Boundary (cont.)

Wetland Name	Cowardin Wetland Classification	Acres	Preliminary Nexus to Waterway	USACE Jurisdictional* or Isolated
House Run				
F-4	100% PEM	0.023	None	Isolated
F-5	100% PEM	0.020	Abutting 40635	Jurisdictional
F-7	100% PEM	0.008	None	Isolated
F-8	95% PEM/5% PSS	0.073	None	Isolated
F-31	100% PEM	0.017	None	Isolated
Wetland E	100% PEM	0.037	Adjacent 40635-L	Jurisdictional
Subtotal		**0.178**		
McCourtney Run				
F-54	100% PEM	0.037	None	Isolated
F-73	80% PEM/20% PSS	0.181	Abutting 40628-X	Jurisdictional
Wetland F	95% PEM/5% PSS	0.023	Headwaters 40628- H4	Jurisdictional
Wetland G	90% PEM/5% PSS/5% PFO	0.012	None	Isolated
Wetland K	100% PEM	0.027	None	Isolated
Subtotal		**0.280**		
South Fork Tenmile Creek				
F-72	100% PEM	0.020	Abutting 40293-UNT1	Jurisdictional
Subtotal		**0.020**		
	TOTAL ACRES	**2.676**		

** All project area wetland resources are jurisdictional under PADEP*

6.4.3 Wetland Functions and Values

Per Smith, et. al., (1995), wetland functions are described as:

> "self-sustaining properties of a wetland ecosystem that exist in the absence of society. Functions result from both living and non-living components of a specific wetland. These include all processes necessary for the self-maintenance of the wetland ecosystem such as primary production and nutrient cycling. Therefore, functions relate to the ecological significance of wetland properties without regard to subjective human values."
> Furthermore, wetland values are described as:
>
> "benefits that derive from both one or more functions and the physical characteristics associated with a wetland. Most wetlands have corresponding societal value. This is recognized in various federal, state, and local wetland legislation enacted to protect these resources. The value of a particular wetland function, or combination thereof, is based on human judgment of the worth, merit, quality, or importance attributed to those functions."

The following paragraphs briefly describe the evaluation criteria in Smith et. al., (1995):

GROUNDWATER RECHARGE/DISCHARGE — This function considers the potential for a wetland to serve as a groundwater recharge and/or discharge area. Recharge should relate to the potential to contribute water to an aquifer. Discharge should relate to the potential for the wetland to serve as an area where groundwater can be discharged to the surface.

FLOODFLOW ALTERATION (Storage & Desynchronization) — This function considers the effectiveness of the wetland in reducing flood damage by attenuation of floodwaters for prolonged periods following precipitation events.

FISH AND SHELLFISH HABITAT — This function considers the effectiveness of seasonal or permanent water bodies associated with the wetland in question for fish and shellfish habitat.

SEDIMENT/TOXICANT/PATHOGEN RETENTION — This function reduces or prevents degradation of water quality. It relates to the effectiveness of the wetland as a trap for sediments, toxicants, or pathogens

NUTRIENT REMOVAL/RETENTION/TRANSFORMATION — This function relates to the effectiveness of the wetland to prevent adverse effects of excess nutrients entering aquifers or surface waters such as ponds, lakes, streams, rivers, or estuaries.

PRODUCTION EXPORT (Nutrient) — This function relates to the effectiveness of the wetland to produce food or usable products for humans or other living organisms.

SEDIMENT/SHORELINE STABILIZATION — This function relates to the effectiveness of a wetland to stabilize stream banks and shorelines against erosion

WILDLIFE HABITAT — This function considers the effectiveness of the wetland to provide habitat for various types and populations of animals typically associated with wetlands and the wetland edge. Both resident and/or migrating species must be considered. Species lists of observed and potential animals should be included in the wetland assessment report.

RECREATION (Consumptive and Non-Consumptive) — This value considers the effectiveness of the wetland and associated water-courses to provide recreational opportunities such as canoeing, boating, fishing, hunting, and other active or passive recreational activities. Consumptive activities consume or diminish the plants, animals, or other resources that are intrinsic to the wetland, whereas non-consumptive activities do not

EDUCATIONAL/SCIENTIFIC VALUE — This value considers the effectiveness of the wetland as a site for an "outdoor classroom" or as allocation for scientific study or research.

UNIQUENESS/HERITAGE — This value relates to the effectiveness of the wetland or its associated water bodies to produce certain special values. Special values may include such things as archaeological sites, unusual aesthetic quality, historical events, or unique plants, animals, or geologic features.

VISUAL QUALITY/AESTHETICS — This value relates to the visual and aesthetic qualities of the wetland.

THREATENED or ENDANGERED SPECIES HABITAT — This value relates to the effectiveness of the wetland or associated water bodies to support threatened or endangered species. Ground water recharge/discharge

A summary of the wetlands functions and values is contained in Table 6-46.

The majority of wetlands identified exhibited characteristics of, or the opportunity to provide, Wildlife Habitat and Production Export function. This conclusion was based on the existence of dense vegetation, a dominant herbaceous and shrub species community, and the opportunity for wildlife to utilize terrestrial habitat that dominates the surrounding project area. However, these functions were determined to be limited due to the small number of wetlands relative to the size of the project area, and the small size (i.e., average < 0.06 acres) of each wetland. The majority of wetlands identified also exhibited the Groundwater Discharge/Recharge function. This conclusion was based on the existence groundwater discharge areas, soil inundation and saturation, the low position within the watershed, and the proximity to other surface waters (e.g., streams - especially those contributing to headwater tributaries).

None of the wetlands exhibited characteristics of, or provided the opportunity for Educational/Scientific values, Uniqueness /Heritage values, or Visual Quality/Aesthetic values. This conclusion is based on the small size, lack of public access, often remote or inaccessible locations within private property, and the presence of common, vegetative communities. In addition, none were identified as providing Threatened or Endangered Species Habitats.

The total wetland acreage (2.676 acres) represents less than 0.2% of the entire project area (1,867 acres). The functions and values wetland resources contribute minimally to the overall wildlife and aquatic habitat, food web, productivity, and base flow conditions of the watersheds in which they exist. The majority of wetlands were located within existing floodplain pasturelands throughout the project area and have been degraded by unrestricted livestock access, and other agricultural activities (e.g., crop production). Others are located within mature forested hillside compartments surrounding the adjacent pastures and agricultural lands. To quantify the baseline condition of project area wetlands, a description of each is provided below.

Table 6-46. Wetland Functions and Values

Wetland Identification	Cowardin Wetland Classification	Total Acres	PEM Acres	PSS Acres	PFO Acres	POW Acres	Preliminary USACE Jurisdictional or Isolated	Groundwater Recharge/Discharge	Floodflow Alteration	Fish and Shellfish Habitat	Sediment/ Toxicant Retention	Nutrient Removal	Production Export	Sediment/ Shoreline Stabilization	Wildlife Habitat	Recreation	COMMENTS
GARNER RUN																	
F-1	85% PEM/15%PSS	0.003	0.003	0.000	-	-	Jurisdictional	X			X		X		X[1]		Toe of railroad embankement and forested hill slope
F-2	90%PEM/10%PSS	0.042	0.038	0.004	-	-	Jurisdictional	X	X		X	X	X	X	X[1]		Adjacent to stream at rear of residential area
F-71	PEM	0.012	0.012	-	-	-	Jurisdictional	X[1]	X		X		X	X	X[1]		Wetland is located between braided stream channels in a forested setting
Wetland H	90%POW/10%PFO	0.380	-	-	0.038	0.342	Jurisdictional	X	X	X	X	X	X		X	X	Deep water with fish present - potential fishing opportunties
Wetland I	10%PEM/5%PFO/85%POW	0.236	0.024	-	0.012	0.201	Jurisdictional	X	X	X	X	X	X	X	X	X	Beaver impounded area, flooded forest area
Wetland J	PEM	0.043	0.043	-	-	-	Jurisdictional	X	X		X		X		X		Located in forested setting adjacent to a dirt, utility access road
40649-W1	85%PEM/15%PSS	0.010	0.009	0.002			Jurisdictional	X					X		X[1]		Located in forested setting
GRINAGE RUN																	
GRI-1	PEM	0.070	0.070	-	-	-	Isolated	X					X		X[1]		Located in an old-field bottomland area
Wetland M	70%PEM/25%PSS/5%PFO	0.124	0.087	0.031	0.006	-	Jurisdictional	X	X		X	X	X		X		Located high in a forested stream valley
HOGE RUN																	
F-16	PEM	0.009	0.009	-	-	-	Jurisdictional	X	X		X	X	X		X[1]		Located within pasture lands
F-19	PEM	0.025	0.025	-	-	-	Isolated	X	X			X	X		X[1]		Located within pasture lands
F-20	PEM	0.067	0.067	-	-	-	Jurisdictional	X	X		X	X[1]	X	X	X		Located within pasture lands
F-21	PEM	0.052	0.052	-	-	-	Isolated	X	X			X[1]	X		X[1]		Located within pasture lands
F-22	PEM	0.012	0.012	-	-	-	Isolated	X	X			X[1]	X		X[1]		Located within pasture lands
F-23	PEM	0.009	0.009	-	-	-	Jurisdictional	X	X			X	X		X[1]		Located within pasture lands
F-28	PEM	0.009	0.009	-	-	-	Isolated	X	X			X[1]	X		X[1]		Located within pasture lands
F-41	90%PEM/10%PSS	0.055	0.050	0.006	-	-	Jurisdictional	X	X		X	X	X	X	X		Mosquito larva, trichoptera cases, and amphibian egg clusters observed
F-44	PEM	0.004	0.004	-	-	-	Jurisdictional	X	X		X	X[1]	X		X[1]		Located within pasture lands
F-45	95%PEM/5%PSS	0.024	0.023	0.001	-	-	Isolated	X	X			X	X		X		Located within a hillside pasture with scrub shrub component
F-52	PEM	0.040	0.040	-	-	-	Jurisdictional	X	X		X	X[1]	X		X		Tadpoles, macroinvertebrates, and snapping turtles observed
F-62	95%PEM/5%PSS	0.006	0.006	0.000	-	-	Isolated	X	X			X	X		X[1]		Located in an opening in reverting pasturelands
F-70	PEM	0.001	0.001	-	-	-	Jurisdictional	X	X		X	X	X	X	X[1]		Located at the toe of a forested slope
HOG-3	PEM	0.168	0.168	-	-	-	Isolated	X[1]	X		X[1]	X[1]	X	X			Located within pasture lands
HOGE-1	PEM	0.128	0.128	-	-	-	Isolated	X[1]				X[1]	X		X[1]		Located within pasture lands
HOGE-2	PEM	0.256	0.256	-	-	-	Isolated	X[1]				X[1]	X		X[1]		Located within pasture lands
R3-1	PEM	0.020	0.020	-	-	-	Jurisdictional	X	X		X	X	X	X	X[1]		Located within pasture lands
R3-2	PEM	0.022	0.022	-	-	-	Jurisdictional	X	X		X	X	X	X	X		Located within pasture lands
R3-3	PEM	0.006	0.006	-	-	-	Jurisdictional	X	X		X	X	X	X	X[1]		Located within pasture lands
R3-4	90%PEM/10%PFO	0.146	0.131	-	0.015	-	Jurisdictional	X	X		X	X	X		X		Located in an opening at the toe of a forested slope
R3-5	PEM	0.084	0.084	-	-	-	Jurisdictional	X[1]	X		X	X[1]	X		X[1]		Located along a floodplain stream terrace
Wetland A	PEM	0.028	0.028	-	-	-	Isolated					X	X		X		Located within pasture lands
Wetland B	PEM	0.001	0.001	-	-	-	Isolated					X	X		X[1]		Located on a forested slope near adjacent pasturelands
Wetland C	95%PEM/5%PSS	0.106	0.101	0.005	-	-	Isolated					X	X[1]		X		Located within pasture lands
HOUSE RUN																	
F-4	PEM	0.023	0.023	-	-	-	Isolated	X	X			X	X		X		Receives water from culvert from Bristoria Road, pastureland
F-5	PEM	0.020	0.020	-	-	-	Jurisdictional	X	X		X	X	X		X[1]		Located at the toe of a slope within a pasture
F-7	PEM	0.008	0.008	-	-	-	Isolated	X			X	X	X		X[1]		Hillside seeps within a pasture, red-spotted newts and tadpoles observed
F-8	95%PEM/5%PSS	0.073	0.069	0.004	-	-	Isolated	X			X	X	X		X[1]		Red-spotted newts and tadpoles observed
F-31	PEM	0.017	0.017	-	-	-	Isolated	X	X			X	X		X		Located within pasture lands
Wetland E	PEM	0.037	0.037	-	-	-	Jurisdictional	X				X	X		X		
McCOURTNEY RUN																	
F-54	PEM	0.037	0.037	-	-	-	Isolated	X[1]	X		X[1]	X[1]	X	X	X		Pockets of inundation present, may be seasonally dry
F-73	80%PEM/20%PSS	0.181	0.145	0.036	-	-	Jurisdictional	X	X		X	X	X[1]	X[1]	X[1]		Located within railroad right of way
Wetland F	95%PEM/5%PSS	0.023	0.022	0.001	-	-	Jurisdictional	X				X	X		X		
Wetland G	90%PEM/5%PSS/5%PFO	0.012	0.011	0.001	0.001	-	Isolated	X				X	X		X[1]		
Wetland K	PEM	0.027	0.027	-	-	-	Isolated	X			X		X		X		
SOUTH FORK TENMILE CREEK																	
F-72	PEM	0.020	0.020	-	-	-	Jurisdictional	X[1]	X		X	X	X	X	X[1]		Receives roadside drainage (SR 0021), within a hayfield
TOTALS		2.676	1.971	0.091	0.071	0.543	19 Isolated 26 Jurisdictional	42	31	2	26	39	45	13	44	2	

NOTE: None of the identified wetlands provided Educational/Scientific Value, Uniqueness/Heritage, Visual Quality/Aesthetics, Endangered Species or Other notable functions and values and were therefore omitted from the table

X = Principle wetland function

6.4.3.1 Garner Run (40628) Watershed Wetlands

Seven (7) wetlands totaling 0.726 acres were identified within the Garner Run Watershed. The following paragraphs provide descriptions of each wetland and identify the primary and secondary functions and values observed for each. More detailed data collected for each wetland is provided in Appendix A.

F-1 – Wetland F-1 was a 0.003 acre, 85% PEM and 15% PSS wetland located adjacent the Norfolk Southern Railroad. The wetland was situated in a depressional toe-of-slope in the vicinity of Grinnage Run Road (T-469). Hydrology was supplied by numerous groundwater discharge areas and overland flow from surrounding uplands. The primary function of the wetland is Groundwater Discharge, owing to the observation of groundwater discharge areas and the proximity and downslope location of existing stream 40644.

F-2 – Wetland F-2 was a 0.042 acre, 90% PEM and 10% PSS wetland located in a depressional area along the floodplain of and abutting the main stem of Garner Run (40643). Surrounding land use was residential and mixed-forested floodplains. Hydrology was supplied by floodflow from Garner Run and overland flow from surrounding uplands. The primary function of the wetland was Floodflow Alteration, owing to the location within the floodplain, proximity to the stream, and a depressional topography. Secondary wetland functions included Sediment Toxicant Retention, Sediment/Shoreline Stabilization and Nutrient Removal, owing to the abutting stream; dense herbaceous vegetation; and potential upstream and upslope sources of sediments and nutrients from nearby roadways, residential, and agricultural land. These functions were determined to be limited due to the small size of the wetland in comparison to the overall watershed.

F-71 – Wetland F-71 was a 0.012 acre, 100% PEM wetland located in a depressional area along the forested floodplain of stream 40645 and was the primary source of hydrology for tributary 40645-X to stream 40645, a tributary to Garner Run. Surrounding land use was mixed-deciduous forested floodplains and valley slopes. Hydrology was supplied primarily by groundwater seepage from the adjacent hillside. Secondary sources of hydrology included stream overflow from 40645 and overland flow from surrounding uplands. The primary function of the wetland was Floodflow Alteration on a micro-scale, owing to the location within the floodplain, proximity to the stream, depressional topography, and a constricted outlet. Secondary wetland functions included Groundwater Discharge, Sediment Toxicant Retention, and Sediment/Shoreline Stabilization, owing to the abutting stream, dense herbaceous vegetation, and potential sources of upstream and upslope sediments. These functions were determined to be limited due to the small size of the wetland in comparison to the overall watershed.

Wetland H – Wetland H was a 0.380 acre, 90% POW and 10% PFO wetland system located in the floodplain along stream 40644. The wetland existed in an abandoned pond basin, evidenced by a relict earthen embankment across the stream valley. Surrounding land use was predominantly mature, deciduous forested floodplain and valley slopes. The wetland was located approximately 300 feet east of an existing Norfolk Southern Railroad right-of-way and embankment. Stream 40644 flowed into the southeastern end of the wetland and discharged

back into the stream channel at the northwestern end. Secondary sources of hydrology included overland flow from adjacent uplands. The wetland was previously delineated as a predominantly PEM wetland, however recent beaver dam construction across the constricted outlet has further restricted stream flow resulting in inundation of the area. The primary function of the wetland was Floodflow Alteration on a relatively large scale; owing to the available capacity to attenuate flood flows, location within the floodplain, perennial stream flow through the system, depressional topography, and a constricted outlet. Secondary wetland functions included Fish and Shellfish Habitat, Sediment Toxicant Retention and Sediment/Shoreline Stabilization, owing to the stream flow, visible velocity decreases within the wetland system, observed fin fish populations, and potential upstream and upslope sources of sediments from channel erosion and adjacent utility access and logging roads.

Wetland I – Wetland I was a 0.236 acre, 85% POW, 10% PEM and 5% PFO wetland system located in the floodplain along stream 40644. The wetland existed in an abandoned pond basin, evidenced by a relict earthen embankment across the stream valley. Surrounding land use was predominantly mature, deciduous forested floodplain and valley slopes. The wetland was located approximately 120 feet east of Wetland H and 420 feet east of an existing Norfolk Southern Railroad right-of-way and embankment. Stream 40644 provided the primary source of hydrology and flowed into the southeastern end of the wetland and discharged to the stream channel at the northwestern end. A secondary source of hydrology included overland flow from adjacent uplands. Beaver dam construction across the constricted outlet restricted stream flow resulting in additional inundation of the area. The primary function of the wetland was Floodflow Alteration on a relatively large scale, owing to the available capacity to attenuate flood flows, location within the floodplain, perennial stream flow through the system, depressional topography, and a constricted outlet. Secondary wetland functions included Fish and Shellfish Habitat, Sediment Toxicant Retention, and Sediment/Shoreline Stabilization, owing to the stream flow, visible velocity decreases within the wetland system, observed fin fish populations, and potential upstream and upslope sources of sediments such as channel erosion and runoff from adjacent bare earth utility access and logging roads.

Wetland J – Wetland J was a 0.043 acre, 100% PEM wetland located in a depressional area along the forested floodplain of stream 40644 - a perennial tributary to Garner Run. Surrounding land use was predominantly mixed-deciduous forested floodplains, valley slopes, and an adjacent utility line access road. Hydrology was supplied primarily by groundwater seepage from the adjacent hillside. Secondary sources of hydrology included stream overflow from 40645 and overland flow from surrounding uplands. The primary function of the wetland was Floodflow Alteration on a micro-scale, owing to the location within the floodplain, proximity to the stream, depressional topography, and a constricted outlet. Secondary wetland functions included Groundwater Discharge, Sediment Toxicant Retention, and Sediment/Shoreline Stabilization, owing to the potential to receive overflow from the nearby stream, dense herbaceous vegetation, and potential upstream and upslope sources of sediments such as channel erosion and runoff from adjacent bare earth utility access and logging roads. These functions were determined to be limited due to the small size of the wetland in comparison to the overall watershed.

40649-W1 – Wetland 40649-W1 was a 0.010 acre, 85% PEM and 15% PSS wetland located along a relict logging road and depressional area at the headwaters of perennial tributary 40649-R4. Surrounding land use was mixed-forested valley slopes. Hydrology was supplied by groundwater from observed discharge areas and overland flow from surrounding uplands. The primary function of the wetland was Groundwater Discharge, owing to the presence of surface discharge areas, gradient within the wetland, and the proximity and downslope location of existing stream 40649-R4. Secondary wetland functions included Production Export and Wildlife Habitat, owing to dense herbaceous vegetation, remote forested setting, and the opportunity for utilization by wildlife. These functions were determined to be limited due to the small size of the wetland in comparison to the overall watershed. However, the wetland does contribute to the base flow of stream 40649-R4.

6.4.3.2 Grinage Run (40647) Watershed Wetlands

Two (2) wetland systems totaling 0.194 acres were identified within the Grinage Run watershed. The following paragraphs provide brief descriptions of each wetland and identify the primary and secondary functions and values observed for each. More detailed data collected for each wetland is provided in Appendix A

GRI-1 – Wetland GRI-1 was a 0.070 acre, 100% PEM wetland located along the Norfolk Southern Railroad embankment. The wetland was situated at the toe-of-slope along an existing access road and Grinnage Run Road (T-469). Surrounding land use consisted of the railroad embankment, fallow agricultural fields, a gravel road, and mixed-deciduous forestland. Hydrology was supplied by numerous groundwater discharge areas and overland flow from surrounding uplands. The primary function of the wetland was Groundwater Discharge/Recharge, owing to the depressional topography and the proximity and downslope location of existing stream 40644. Secondary wetland functions included Production Export and Wildlife Habitat, owing to the presence of dense herbaceous vegetation, rural setting, and opportunity for utilization by wildlife. These functions were determined to be limited due to the small size of the wetland in comparison to the overall watershed and availability of other habitat in the vicinity.

Wetland M – Wetland M was a 0.124 acre, 70% PEM, 25% PSS and 5% PFO wetland located in a depressional area within the forested floodplain of intermittent stream 40647-T1j. Surrounding land use was mixed-deciduous forested floodplains and valley slopes. Hydrology was supplied primarily by groundwater seepage from the toe of the adjacent hillside. Secondary sources of hydrology included stream overflow from 40647-T1j and T1 and overland flow from surrounding uplands. The primary function of the wetland was Floodflow Alteration on a micro-scale, owing to the location within the floodplain, stream flow through the wetland, depressional topography, and ability to accept out of bank flow. Secondary wetland functions included Groundwater Discharge and Sediment Toxicant Retention, owing to the abutting stream, dense herbaceous vegetation, and potential upstream and upslope sources of sediments. These functions were determined to be limited due to the small size of the wetland in comparison to the overall watershed.

6.4.3.3 Hoge Run (40632) Watershed Wetlands

Twenty-four (24) wetland systems totaling 1.278 acres were identified within the Hoge Run Watershed. The following paragraphs provide brief descriptions of each wetland and identify the primary and secondary functions and values observed for each. More detailed data collected for each wetland is provided in Appendix A.

F-16 – Wetland F-16 was a 0.009 acre, 100% PEM wetland located in a depressional area along a pasture and the forested floodplain of stream 40632-JJ - a perennial tributary to Garner Run. Surrounding land use was predominantly mixed-deciduous forested floodplains, valley slopes, and adjacent pasturelands. Hydrology was supplied primarily by groundwater seepage from the adjacent hillside. Secondary sources of hydrology included stream overflow from 40632-JJ and overland flow from surrounding uplands. The primary function of the wetland was Groundwater Discharge, owing to the observed discharge areas within the wetland. Secondary functions included Floodflow Alteration on a micro-scale, owing to the location within the floodplain, stream flow through the wetland, and depressional topography. Nutrient Removal was also occurring, based on the observance of dense herbaceous vegetation and potential upstream and upslope sources of nutrients from livestock manure. These functions were determined to be limited due to the small size of the wetland in comparison to the overall watershed.

F-19 – Wetland F-19 was a 0.025 acre, 100% PEM wetland located in a pasture within a hillside depression. Surrounding land use was predominantly pasturelands with nearby mixed-deciduous forested compartments Hydrology was supplied primarily by groundwater seepage from the adjacent hillside. Secondary sources of hydrology included overland flow from surrounding uplands. The primary function of the wetland was Nutrient Removal, owing to dense herbaceous vegetation, depressional topography, and upslope sources of nutrients from livestock manure. Secondary functions were Groundwater Discharge, owing to the observed discharge areas within the wetland. These functions were determined to be limited due to the small size of the wetland in comparison to the overall watershed and lack of a surface connection to other surface waters.

F-20 – Wetland F-20 was a 0.067 acre, 100% PEM wetland located in a depressional area along a gently sloping pasture at the toe of a forested valley slope of stream 40632-H - a perennial tributary to Hoge Run. Surrounding land use was predominantly floodplain pasturelands and mixed-deciduous forested valley slopes. Hydrology was supplied primarily by groundwater seepage from the adjacent hillside. Secondary sources of hydrology included stream overflow from 40632-H and overland flow from surrounding uplands. The primary function of the wetland was Groundwater Discharge, owing to the observed groundwater discharge areas within the wetland. Secondary functions included Floodflow Alteration on a micro-scale, owing to the location within the floodplain, stream flow through the wetland, and depressional topography. Nutrient Removal was also occurring based on the observance of dense herbaceous vegetation and potential upstream and upslope sources of nutrients from livestock manure. These functions were determined to be limited due to the small size of the wetland in comparison to the overall watershed.

F-21 – Wetland F-21 was a 0.052 acre, 100% PEM wetland located in a pasture within a hillside depression. Surrounding land use was predominantly pasturelands with nearby mixed-deciduous forested compartments. Hydrology was supplied primarily by groundwater seepage from the adjacent hillside. Secondary sources of hydrology included overland flow from surrounding uplands. The primary function of the wetland was Nutrient Removal, owing to dense herbaceous vegetation, depressional topography, and upslope sources of nutrients from livestock manure. Secondary functions were Groundwater Discharge owing to the observed discharge areas within the wetland. These functions were determined to be limited due to the small size of the wetland in comparison to the overall watershed and lack of a surface connection to other surface waters.

F-22 – Wetland F-22 was a 0.012 acre, 100% PEM wetland located in a pasture within a hillside depression. Surrounding land use was predominantly pasturelands with nearby mixed-deciduous forested compartments Hydrology was supplied primarily by groundwater seepage from the adjacent hillside. Secondary sources of hydrology included overland flow from surrounding uplands. The primary function of the wetland was Nutrient Removal, owing to the dense herbaceous vegetation, depressional topography, and upslope sources of nutrients from livestock manure. Secondary functions were Groundwater Discharge, owing to the observed groundwater discharge areas within the wetland. These functions were limited due to the small size of the wetland in comparison to the overall watershed and lack of a surface connection to other surface waters.

F-23 – Wetland F-23 was a 0.009 acre, 100% PEM wetland located in a depressional area along a gently sloping pasture and valley slope of stream 40632-HH - an ephemeral and intermittent tributary to Hoge Run. Surrounding land use was predominantly adjacent hillside pasturelands and nearby mixed-deciduous forested valley slopes. Hydrology was supplied primarily by groundwater seepage from the adjacent hillside. Secondary sources of hydrology included overland flow from surrounding uplands. The primary function of the wetland was Groundwater Discharge owing to the observed discharge areas within the wetland and the proximity and down-gradient location of ephemeral stream 40632-HH. Secondary functions included Floodflow Alteration on a micro-scale owing to the location within the floodplain, stream flow adjacent to the wetland and depressional topography and Nutrient Removal, owing to the presence of dense herbaceous vegetation and potential upstream and upslope sources of nutrients from livestock manure. These functions were determined to be limited due to the small size of the wetland in comparison to the overall watershed.

F-28 – Wetland F-28 was a 0.009 acre, 100% PEM wetland located at the edge of a forested compartment in a depression in a hillside pasture. Surrounding land use was predominantly pasturelands with nearby mixed-deciduous forestland. Hydrology was supplied primarily by groundwater seepage from the adjacent hillside. Secondary sources of hydrology included overland flow from surrounding uplands. The primary function of the wetland was Nutrient Removal, owing to the dense herbaceous vegetation, depressional topography and upslope sources of nutrients from livestock manure. Secondary function was Groundwater Discharge, owing to the observed discharge areas within the wetland. These functions were determined to be limited due to the small size of the wetland in comparison to the overall watershed and lack of a surface connection to other surface waters.

F-41 – Wetland F-41 was a 0.055 acre, 90% PEM and 10% PSS wetland located in a depression along the floodplain of and abutting stream 40634 - perennial tributary of Hoge Run. Surrounding land use was residential and mixed-pastureland floodplain with nearby agricultural structures. Hydrology was supplied primarily by stream overflow from 40634 and overland flow from surrounding uplands. The primary function of the wetland was Floodflow Alteration, owing to the location within the floodplain, proximity to the stream and depressional topography. Secondary wetland functions included Groundwater Discharge/Recharge, Sediment Toxicant Retention, Sediment/Shoreline Stabilization and Nutrient Removal, owing to the perennial stream flow through the system, dense herbaceous vegetation and potential upstream and upslope sources of sediments and nutrients from nearby roadways, residential and agricultural land. These functions were determined to be limited due to the small size of the wetland in comparison to the overall watershed.

F-44 – Wetland F-44 was a 0.004 acre, 100% PEM wetland located in a depressional area along a gently sloping pasture adjacent to stream 40632-BB, an intermittent tributary to Hoge Run. Surrounding land use was predominantly reverting pasturelands with nearby mixed-deciduous forested hillside compartments. Hydrology was supplied primarily by groundwater seepage from the adjacent hillside. Secondary sources of hydrology included stream overflow from 40632-BB and overland flow from surrounding uplands. The primary function of the wetland was Floodflow Alteration on a micro-scale owing to the location within the floodplain, stream flow nearby the wetland and depressional d. Secondary functions included Groundwater Discharge owing to the observed ground water discharge areas within the wetland and Nutrient Removal due to the presence of dense herbaceous vegetation and potential upstream and upslope sources of nutrients from livestock manure. These functions were determined to be limited due to the small size of the wetland in comparison to the overall watershed.

F-45 – Wetland F-45 was a 0.024 acre, 95% PEM and 5% PSS wetland located in a depressional area along the floodplain of and abutting stream 40632-DD, an ephemeral and intermittent tributary of Hoge Run. Surrounding land use upslope was predominantly mixed-deciduous valley hillside with downslope adjacent hay field floodplain and nearby agricultural lands. Hydrology was supplied primarily by overland flow from surrounding uplands. The primary function of the wetland was Floodflow Alteration owing to the location within the floodplain of 40632-DD, channel flow through the system and depressional topography. Secondary wetland functions included Groundwater Discharge/Recharge owing to the observed hillside ground water discharge areas, and Nutrient Removal owing to the dense herbaceous vegetation and potential upstream and upslope sources of nutrients from nearby agricultural land. These functions were determined to be limited due to the small size of the wetland in comparison to the overall watershed.

F-52 – Wetland F-52 was a 0.040 acre, 100% PEM wetland located in a depressional area within a floodplain pasture adjacent to Hoge Run. Surrounding land use was predominantly floodplain pasturelands, Hoge Run Road right of way and mixed-deciduous forested valley slopes. Hydrology was supplied primarily by groundwater seepage from the adjacent hillside. Secondary sources of hydrology included out of bank stream overflow from 40632 and overland flow from surrounding uplands. The primary function of the wetland was Floodflow Alteration

on a micro-scale owing to the location within the floodplain, adjacent stream flow near the wetland and depressional ground surface. Secondary functions included and Nutrient Removal and Sediment Toxicant Removal due to the presence of dense herbaceous vegetation and potential upstream and upslope sources of sediments and nutrients, and Groundwater Discharge owing to the observed ground water discharge areas within the wetland. These functions were determined to be limited due to the small size of the wetland in comparison to the overall watershed.

F-62 – Wetland F-62 was a 0.006 acre, 95% PEM and 5% PSS wetland located in a depression at the edge of a scrub shrub opening on a mixed-deciduous forested hillside. Surrounding land use was predominantly mixed-deciduous forestland and scrub shrub openings. Hydrology was supplied primarily by groundwater seepage from the adjacent hillside. Secondary sources of hydrology included overland flow from surrounding uplands. The primary function of the wetland was Wildlife Habitat owing to the dense herbaceous vegetation and opportunity for utilization within the scrub shrub opening surrounded by mature forestlands. Secondary functions were Groundwater Discharge owing to the observed ground water discharge areas within the wetland and Production Export owing to the variety of herbaceous plants within the wetland. These functions were determined to be limited due to the small size of the wetland in comparison to the overall watershed and lack of a surface connection to other surface waters.

F-70 – Wetland F-70 was a 0.001 acre, 100% PEM wetland located in a depressional area along a scrub shrub and old field opening within a forested hillside and contributes to the headwaters of stream 40632-M1a, an intermittent tributary to Hoge Run. Surrounding land use was predominantly mixed-deciduous forested valley slopes and old field and scrub shrub land. Hydrology was supplied primarily by groundwater seepage within the wetland. The secondary source of hydrology included overland flow from surrounding uplands. The primary function of the wetland was Groundwater Discharge owing to the observed ground water discharge areas within the wetland and the contribution to the intermittent stream located downslope. Secondary functions included Floodflow Alteration on a micro-scale owing to the location within the headwaters of the stream and depressional topography and Sediment/ Toxicant Retention due to the presence of dense herbaceous vegetation and potential upstream and upslope sources of sediments. These functions were determined to be severely limited due to the small size of the wetland in comparison to the overall watershed.

HOGE-1 – Wetland HOGE-1 was a 0.128 acre, 100% PEM wetland located in a pasture within a gently sloping hillside and floodplain depression of Hoge Run. Surrounding land use was predominantly pasturelands with nearby mixed-deciduous forested compartments. Hydrology was supplied primarily by groundwater seepage from the adjacent hillside. The secondary source of hydrology included overland flow from surrounding uplands. The primary function of the wetland was Nutrient Removal owing to the dense herbaceous vegetation, depressional topography, upslope sources of nutrients (livestock manure) and down gradient location of Hoge Run. Secondary functions were Groundwater Discharge owing to the observed ground water discharge areas within the wetland. These functions were determined to be limited due to the small size of the wetland in comparison to the overall watershed and lack of a surface connection to other surface waters.

HOGE-2 – Wetland HOGE-2 was a 0.256 acre, 100% PEM wetland located in a pasture within a gently sloping hillside and floodplain depression of Hoge Run. Surrounding land use was predominantly pasturelands with nearby mixed-deciduous forested compartments. Hydrology was supplied primarily by groundwater seepage from the adjacent hillside. The secondary source of hydrology included overland flow from surrounding uplands. The primary function of the wetland was Nutrient Removal owing to the dense herbaceous vegetation, depressional topography, upslope sources of nutrients (livestock manure) and down gradient location of Hoge Run. Secondary functions were Groundwater Discharge owing to the observed ground water discharge areas within the wetland. These functions were determined to be limited due to the small size of the wetland in comparison to the overall watershed and lack of a surface connection to other surface waters.

HOG-3 – Wetland HOG-3 was a 0.168 acre, 100% PEM wetland located in a pasture within a gently sloping hillside depression. Surrounding land use was predominantly pasturelands with nearby mixed-deciduous forested compartments. Hydrology was supplied primarily by groundwater seepage from the adjacent hillside. The secondary source of hydrology included overland flow from surrounding uplands. The primary function of the wetland was Nutrient Removal owing to the dense herbaceous vegetation, depressional topography, upslope sources of nutrients (livestock manure) and down gradient location of Hoge Run. Secondary functions were Groundwater Discharge owing to the observed ground water discharge areas within the wetland. These functions were determined to be limited due to the small size of the wetland in comparison to the overall watershed and lack of a surface connection to other surface waters.

R3-1 – Wetland R3-1 was a 0.020 acre, 100% PEM wetland located in a depressional area along the floodplain of stream 40632-P, a perennial tributary of Hoge Run. Surrounding land use was residential and mixed-pastureland floodplain with mixed-deciduous forested floodplain and valley slopes. Hydrology was supplied primarily by stream overflow from 40632-P and overland flow from surrounding uplands. The primary function of the wetland was Floodflow Alteration owing to the location within the floodplain, perennial stream flow through the wetland and depressional topography. Secondary wetland functions included Groundwater Discharge/Recharge, Sediment Toxicant Retention, Sediment/Shoreline Stabilization and Nutrient Removal owing to the perennial stream flow through the system, dense herbaceous vegetation and potential upstream and upslope sources of sediments and nutrients from nearby roadways, residential and agricultural land. These functions were determined to be limited due to the small size of the wetland in comparison to the overall watershed.

R3-2 – Wetland R3-2 was a 0.022 acre, 100% PEM wetland located in a depressional area along the floodplain of stream 40632-P, a perennial tributary of Hoge Run. Surrounding land use was residential and mixed-pastureland floodplain valley slopes with agricultural structures. Hydrology was supplied primarily by stream overflow from 40632-P and overland flow from surrounding uplands. The primary function of the wetland was Floodflow Alteration owing to the location within the floodplain, perennial stream flow through the wetland and depressional topography. Secondary wetland functions included Groundwater Discharge/Recharge, Sediment Toxicant Retention, Sediment/Shoreline Stabilization and Nutrient Removal owing to the perennial stream flow through the system, dense herbaceous vegetation and potential upstream and upslope sources of sediments and nutrients from nearby roadways, residential and

agricultural land. These functions were determined to be limited due to the small size of the wetland in comparison to the overall watershed.

R3-3 – Wetland R3-3 was a 0.006 acre, 100% PEM wetland located in a depressional area along the floodplain of stream 40632-P, a perennial tributary of Hoge Run. Surrounding land use was residential and mixed-pastureland floodplain valley slopes with agricultural structures. Hydrology was supplied primarily by stream overflow from 40632-P and overland flow from surrounding uplands. The primary function of the wetland was Floodflow Alteration owing to the location within the floodplain, perennial stream flow through the wetland and depressional topography. Secondary wetland functions included Groundwater Discharge/Recharge, Sediment Toxicant Retention, Sediment/Shoreline Stabilization and Nutrient Removal owing to the perennial stream flow through the system, dense herbaceous vegetation and potential upstream and upslope sources of sediments and nutrients from nearby roadways, residential and agricultural land. These functions were determined to be severely limited due to the small size of the wetland in comparison to the overall watershed.

R3-4 – Wetland RS-4 was a 0.146 acre, 90% PEM and 10% PSS wetland located in a depressional area along the floodplain of and abutting stream 40632-P, a perennial tributary of Hoge Run and stream 40632-P7, an intermittent tributary to 40632-P. Surrounding land use was predominantly mixed-deciduous forested floodplains and valley slopes, residential lands and nearby pastureland and agricultural structures. Hydrology was supplied primarily by stream overflow from 40632-P and 40632-P7 and overland flow from surrounding uplands. The primary function of the wetland was Floodflow Alteration owing to the location within the floodplain, stream flow through the system and low, depressional topography. Secondary wetland functions included Groundwater Discharge/Recharge, Sediment Toxicant Retention, Sediment/Shoreline Stabilization and Nutrient Removal owing to the perennial and intermittent stream flow through the system, dense herbaceous vegetation and potential upstream and upslope sources of sediments and nutrients from nearby roadways, residential and agricultural land. These functions were determined to be limited due to the small size of the wetland in comparison to the overall watershed.

R3-5 – Wetland R3-5 was a 0.084 acre, 100% PEM wetland located on a stream terrace and depressional area abutting Hoge Run. Surrounding land use was predominantly mixed-deciduous forested hillside, pastureland floodplain and valley slopes with nearby agricultural structures. Hydrology was supplied primarily by stream overflow from Hoge Run and overland flow from surrounding uplands. The primary function of the wetland was Floodflow Alteration owing to the location within the floodplain, perennial stream flow abutting the wetland and depressional topography. Secondary wetland functions included Groundwater Discharge/Recharge, Sediment Toxicant Retention and Nutrient Removal owing to the perennial stream flow through the system, dense herbaceous vegetation and potential upstream and upslope sources of sediments and nutrients from upstream channel erosion and nearby agricultural land. These functions were determined to be limited due to the small size of the wetland in comparison to the overall watershed

Wetland A – Wetland A was a 0.028 acre, 100% PEM wetland located in a power line right of way within a hillside depression. Surrounding land use was predominantly grassland right of

way with nearby mixed-deciduous forest lands. Hydrology was supplied primarily by overland flow from surrounding uplands. The primary function of the wetland was Wildlife Habitat due to the dense herbaceous cover provided and location along a forested edge and potential travel corridor. Secondary functions were Nutrient Removal owing to the dense herbaceous vegetation, depressional topography and potential for upslope sources of nutrients (livestock manure) and Production Export. These functions were determined to be limited due to the small size of the wetland in comparison to the overall watershed and lack of a surface connection to other surface waters.

Wetland B – Wetland B was a 0.001 acre, 100% PEM wetland located in a deciduous forested, hillside depression adjacent to a power line right of way. Surrounding land use was predominantly mixed-deciduous forest lands, floodplain pasture and grassland utility right of way. Hydrology was supplied primarily overland flow from surrounding uplands. The primary function of the wetland was Wildlife Habitat due to the dense herbaceous cover provided and location within a forested hillside along a potential travel corridor. Secondary functions were Nutrient Removal owing to the dense herbaceous vegetation, depressional topography and potential for upslope sources of nutrients (livestock manure) and Production Export. These functions were determined to be severely limited due to the small size of the wetland in comparison to the overall watershed and lack of a surface connection to other surface waters.

Wetland C – Wetland C was a 0.106 acre, 95% PEM and 5% PSS wetland located in a pasture within a depression on the floodplain of Hoge Run. Surrounding land use was predominantly pasturelands with nearby mixed-deciduous forested compartments. Hydrology was supplied primarily by overland flow from surrounding uplands, in part conveyed to the wetland area by ephemeral channel 40632-EE. The primary function of the wetland was Nutrient Removal owing to the dense herbaceous vegetation, depressional topography and adjacent and upslope sources of nutrients (livestock manure). Secondary functions were Wildlife Habitat and Production Export. These functions were determined to be limited due to the small size of the wetland in comparison to the overall watershed and lack of a surface connection to other surface waters.

6.4.3.4 House Run (40635) Watershed Wetlands

Six (6) wetland systems totaling 0.178 acres were identified within the House Run Watershed portion of the project. The following paragraphs provide brief descriptions of each wetland and identify the primary and secondary functions and values observed for each. More detailed data collected for each wetland is provided in Appendix A.

F-4 – Wetland F-4 was a 0.023 acre, 100% PEM wetland located in a pasture within a floodplain depression of House Run. Surrounding land use was predominantly pasturelands, residential, a local roadway and nearby agricultural lands and structures. Hydrology was supplied primarily by overland flow from surrounding uplands and roadway runoff from an existing pipe beneath Bristoria Road. The primary function of the wetland was Nutrient Removal owing to the dense herbaceous vegetation, depressional topography and upslope sources of nutrients (livestock manure). Secondary functions were Floodflow Alteration of House Run out of bank flow and

storm runoff from the roadway and Groundwater Recharge/Discharge owing to the observed ground water discharge areas within the wetland. These functions were determined to be limited due to the small size of the wetland in comparison to the overall watershed and lack of a surface connection to other surface waters.

F-5 – Wetland F-5 was a 0.020 acre, 100% PEM wetland located in a depressional area along the floodplain of stream 40635, House Run. Surrounding land use was mixed-pastureland floodplain, forested valley slopes and residential. Hydrology was supplied primarily by stream overflow from House Run and overland flow from surrounding uplands. The primary function of the wetland was Floodflow Alteration owing to the location within the floodplain, perennial stream flow through the wetland and depressional topography. Secondary wetland functions included Groundwater Discharge/Recharge, Sediment Toxicant Retention, Sediment/Shoreline Stabilization and Nutrient Removal owing to the perennial stream flow through the system, dense herbaceous vegetation and potential upstream and upslope sources of sediments and nutrients from nearby roadways, residential and agricultural land. These functions were determined to be limited due to the small size of the wetland in comparison to the overall watershed.

F-7 – Wetland F-7 was a 0.008 acre, 100% PEM wetland located in a depression within a sloping pasture up gradient of House Run. Surrounding land use was predominantly reverting pasturelands with nearby mixed-deciduous forested valley slope compartments. Hydrology was supplied primarily by groundwater seepage from within the wetland and adjacent hillside. The secondary source of hydrology included overland flow from surrounding uplands. The primary function of the wetland was Nutrient Removal owing to the dense herbaceous vegetation, depressional topography, upslope sources of nutrients (livestock manure) and down gradient location of House Run. Secondary functions were Groundwater Discharge owing to the observed ground water discharge areas within the wetland and Sediment Toxicant Retention. These functions are determined to be limited due to the small size of the wetland in comparison to the overall watershed and lack of a surface connection to other surface waters.

F-8 – Wetland F-8 was a 0.073 acre, 95% PEM and 5% PSS wetland located adjacent to Wetland F-7 in a depression within a sloping pasture up gradient of House Run. Surrounding land use was predominantly reverting pasturelands with nearby mixed-deciduous forested valley slope compartments. Hydrology was supplied primarily by groundwater seepage from within the wetland and adjacent hillside. The secondary source of hydrology included overland flow from surrounding uplands. The primary function of the wetland was Nutrient Removal owing to the dense herbaceous vegetation, depressional topography, upslope sources of nutrients (livestock manure) and down gradient location of House Run. Secondary functions were Groundwater Discharge owing to the observed ground water discharge areas within the wetland and Sediment Toxicant Retention. These functions were determined to be limited due to the small size of the wetland in comparison to the overall watershed and lack of a surface connection to other surface waters.

F-31 – Wetland F-31 was a 0.017 acre, 100% PEM wetland located in a pasture within a hillside depression. Surrounding land use was predominantly pasturelands with nearby mixed-deciduous forestland. Hydrology was supplied primarily by groundwater seepage from the

adjacent hillside. Secondary sources of hydrology included overland flow from surrounding uplands. The primary function of the wetland was Nutrient Removal owing to the dense herbaceous vegetation, depressional topography and upslope sources of nutrients (livestock manure). Secondary functions were Groundwater Discharge owing to the observed ground water discharge areas within the wetland. These functions were determined to be limited due to the small size of the wetland in comparison to the overall watershed and lack of a surface connection to other surface waters.

Wetland E – Wetland E was a 0.037 acre, 100% PEM wetland located within a narrow forest clearing and depressional area along the floodplain of perennial tributary 40645-L to House Run. Surrounding land use was mixed-deciduous forested floodplain and valley slopes, pasturelands and agricultural structures. Hydrology was supplied primarily by groundwater from observed ground water discharge areas and overland flow from surrounding uplands. The primary function of the wetland is Groundwater Discharge owing to the presence of surface ground water discharge areas and the proximity and downslope location of existing stream 40645-L. Secondary wetland functions included Production Export and Wildlife Habitat owing to the dense herbaceous vegetation, forested setting and opportunity for utilization by wildlife. These functions were determined to be limited due to the small size of the wetland in comparison to the overall watershed.

6.4.3.5 McCourtney Run (40628) Watershed Wetlands

Five (5) wetland systems totaling 0.280 acres were identified within the McCourtney Run Watershed portion of the project. The following paragraphs provide brief descriptions of each wetland and identify the primary and secondary functions and values observed for each. More detailed data collected for each wetland is provided in Appendix A.

F-54 – Wetland F-54 was a 0.037 acre, 100% PEM wetland located in a depressional area at the toe of the S.R. 0018 (Golden Oaks Rd) road embankment along the floodplain of McCourtney Run. Surrounding land use was mixed-pastureland floodplain, forested valley slopes and road right of way. Hydrology was supplied primarily by stream overflow from overland flow from surrounding uplands. The primary function of the wetland was Floodflow Alteration owing to the location within the floodplain McCourtney Run, perennial stream flow through the wetland and depressional topography. Secondary wetland functions included Groundwater Discharge/Recharge, Sediment Toxicant Retention and Nutrient Removal owing to the perennial stream flow in the vicinity, dense herbaceous vegetation and potential upstream and upslope sources of sediments and nutrients from nearby roadways, and agricultural land. These functions were determined to be limited due to the small size of the wetland in comparison to the overall watershed.

F-73 – Wetland F-73 was a 0.181 acre, 80% PEM and 20% PSS wetland located along the Norfolk Southern Railroad right of way. The wetland was situated in a depressional opening on a steeply sloped mixed-deciduous hillside at the headwaters of intermittent tributary 40628-X. Stream 40628-X flowed through the wetland to a cross pipe beneath the railroad bed and ultimately discharged to McCourtney Run. Surrounding land use was mixed-forested valley slopes and railroad right of way. Hydrology was supplied primarily by groundwater from

observed ground water discharge areas and overland flow from surrounding forested uplands. The primary function of the wetland is Groundwater Discharge owing to the presence of surface ground water discharge areas, gradient within the wetland and the proximity and downslope location of existing stream 40649-R4. Secondary wetland functions included Sediment Toxicant Retention, Sediment/Shoreline Stabilization owing to the dense herbaceous and scrub shrub vegetation along the stream channel, up gradient sources of sediment and evidence of sediment deposition and velocity decreases in the wetland. In addition the wetland provided the Production Export and Wildlife Habitat functions owing to the dense herbaceous vegetation, remote adjacent forested setting and opportunity for utilization by wildlife. These functions were determined to be limited due to the small size of the wetland in comparison to the overall watershed although the wetland does contribute to the base flow of the associated intermittent stream 40628-X to a greater extent.

Wetland F – Wetland F was a 0.023 acre, 95% PEM and 5% PSS wetland located in a depressional area at the headwaters of intermittent tributary 40628-H4. Surrounding land use was mixed-forested valley slopes and the adjacent Norfolk Southern Railroad right of way. Hydrology was supplied primarily by groundwater from observed ground water discharge areas within the wetland and overland flow from surrounding uplands. The primary function of the wetland is Groundwater Discharge owing to the presence of surface ground water discharge areas, gradient within the wetland and the proximity and down gradient location of existing stream 40628-H4. Secondary wetland functions included Production Export and Wildlife Habitat owing to the dense herbaceous vegetation, remote forested setting and opportunity for utilization by wildlife. These functions were determined to be limited due to the small size of the wetland in comparison to the overall watershed although the wetland does contribute to the base flow of the associated stream 40628-H4 to a greater extent.

Wetland G – Wetland G was a 0.012 acre, 90% PEM, 5% PSS and 5% PFO wetland located in a depressional area in a mixed-deciduous forested hillside adjacent to the Norfolk Southern Railroad right of way. Surrounding land use was mixed-forested valley slopes and the Norfolk Southern Railroad right of way. Hydrology was supplied primarily by groundwater from observed ground water discharge areas within the wetland and overland flow from surrounding uplands. The primary function of the wetland is Groundwater Discharge owing to the presence of surface ground water discharge areas and gradient within the wetland. Secondary wetland functions included Production Export and Wildlife Habitat owing to the dense herbaceous vegetation, remote forested setting and opportunity for utilization by wildlife. These functions were determined to be limited due to the small size of the wetland and lack of a surface connection to other surface waters.

Wetland K – Wetland K was a 0.027 acre, 100% PEM wetland located in a depressional area in a clearing of the forested floodplain of McCourtney Run at the toe of the Norfolk Southern Railroad embankment slope. Surrounding land use was mixed-forested floodplains and the Norfolk Southern Railroad embankment and right of way. Hydrology was supplied primarily by groundwater from observed ground water discharge areas within the wetland and overland flow from surrounding uplands primarily the railroad embankment slope. The primary function of the wetland is Sediment Toxicant Retention owing to the dense herbaceous vegetation, gradient present within the wetland and the proximity and down gradient location of McCourtney Run.

Secondary wetland functions included Production Export, Groundwater Recharge/Discharge and Wildlife Habitat owing to the dense herbaceous vegetation, presence of ground water discharge areas within the wetland, remote forested setting and opportunity for utilization by wildlife. These functions were determined to be limited due to the small size of the wetland in comparison to the overall watershed.

6.4.3.6 South Fork Tenmile Creek (40293) Site Wetlands

One (1) wetland system totaling 0.020 acre was identified within the South Fork Tenmile Creek Watershed portion of the project. The following paragraph provides a brief description of the wetland and identifies the primary and secondary functions and values observed. More detailed data collected for each wetland is provided in Appendix A.

F-72 – Wetland F-72 was a 0.20 acre, 100% PEM wetland located at the toe of the SR. 0021 road embankment at the edge of an existing hayfield in a depressional area along the riparian forested floodplain of South Fork Tenmile Creek. The wetland abuts stream 40293-UNT1, an ephemeral and intermittent tributary to South Fork Tenmile Creek. Surrounding land use was predominantly hayfield, mixed-deciduous forested floodplains and valley slopes and the adjacent state road embankment and right of way. Hydrology was supplied primarily by groundwater seepage from the adjacent hillside. Secondary sources of hydrology included stream overflow from 40293-UNT1 and overland flow from surrounding uplands and the roadway which were conveyed beneath the roadway to the stream via a pipe. The primary function of the wetland was Floodflow Alteration on a micro-scale owing to the location within the floodplain, proximity to the intermittent stream, depressional topography and constricted outlet. Secondary wetland functions included Groundwater Discharge, Sediment Toxicant Retention, Sediment/Shoreline Stabilization owing to the potential to receive overflow from the nearby stream, dense herbaceous vegetation and potential upstream and upslope sources of sediments. These functions were judged to be limited due to the small size of the wetland in comparison to the overall watershed.

6.4.4 <u>Environmental Impacts – Wetlands and Wetland Functions</u>

This section of the 404 Permit Application describes unavoidable impacts to wetlands and the loss or reduction in wetland functions and values that may result from development of the preferred alternatives. Efforts undertaken during the design process to avoid and minimize impacts are presented in Section 4.0 of the document.

Of the forty-five (45) wetland systems identified within the project area, eighteen (18) wetlands totaling 1.177 acres will be avoided and twenty-seven (27) wetlands totaling 1.499 acres will be partially or completely impacted. Of the twenty-seven (27) impacted wetlands, twenty-five (25) will be completely impacted while two (2) will result in partial impacts. As a result, the total wetland impact for the project area will be 1.305 acres. The wetland impacts represent 1.278 acres of PEM wetland, 0.010 acre of PSS wetland, and 0.016 acres of PFO wetland.

Impacts to wetland resources will primarily occur due to the placement of earthen fill embankments and/or the excavation of cut slopes associated with grading activities that are required to establish various operational pad areas for surface facilities, stockpiles and laydown areas, the shaft pad, various internal access roads, the rail road siding, loadout area, water impoundment and other infrastructure and improvements necessary for the development of the Foundation Mine project. Table 6-47 provides a summary of the anticipated wetland impacts associated with construction of the preferred development alternatives.

The majority of wetlands that will be impacted by the development provide Floodflow Alteration and Nutrient Removal as primary functions, owing to the low position within the landscape, association with perennial and intermittent streams, and proximity to existing agricultural lands; including pasture, hayfields, livestock feeding areas, and pens. Many of the wetlands also provided secondary functions including Groundwater Recharge/Discharge, Production Export and Wildlife Habitat; owing to observed groundwater discharge areas; perched water tables; diversity and density of native, herbaceous forbs, grasses and other vegetation that provide the opportunity for utilization by a variety of insects, birds, and mammals. Wetlands abutting project area streams provided the Sediment/Toxicant Retention Functions as well as Sediment/Shoreline Stabilization functions. All of these functions were determined to be marginal due primarily to the small size of the resources in comparison to their parent watersheds and the wide spatial distribution of the wetlands throughout the project area.

Proposed wetland impacts may result in complete fills or total excavation of the wetland and surrounding uplands. Therefore, the wetland and its associated functions and values would be permanently impacted. The only exceptions to this condition are the partial impacts to wetland F-73 at the northern extent of the proposed railroad siding development and the partial impacts to wetland GRI-1 at the southern extent of the proposed railroad siding development. The impact to Wetland F-73 will occur to the narrow, downslope portion of the wetland at its outlet as this area will be lost in cut from railroad siding grading operations. The impact to Wetland GRI-1 will occur to the portion of the wetland nearest the existing railroad embankment toe of slope as fill will be placed to accommodate the widening of the rail bed and embankment for the rail siding.

F-73 – Wetland F-73 is 0.181 acres in size. A small portion totaling 0.007 acres will be excavated and lost to grading activities associated with the railroad siding widening at the northern end of the project area. The cut slope design will avoid 0.174 acres of wetland F-73 preserving the functions and values that the wetland provides.

GRI-1 – Wetland GRI-1 is 0.070 acres in size. GRI-1 will be partially impacted by the placement of fill and excavation of an associated conveyance channel for the railroad siding embankment widening located at the southern end of the project area. The toe of the embankment slope and the channel excavation will encroach upon 0.050 acres of the wetland however the design will avoid approximately 0.020 acres of wetland area preserving, in part, the functions and values that GRI-1 provides.

Table 6-47. Wetlands Impacts the Foundation Mine Section 404 Project Area

Impacted Wetlands Identification	Cowardin Wetland Classification	Total Acres Existing	PEM Acres Existing	PSS Acres Existing	PFO Acres Existing	POW Acres Existing	Total Acres Impacts	PEM Acres Impacts	PSS Acres Impacts	PFO Acres Impacts	POW Acres Impacts
Garner Run											
F-1	85% PEM/15%PSS	0.003	0.003	-	-	-	0.003	0.003	-	-	-
40649-W1	85% PEM/15%PSS	0.010	0.008	0.002	-	-	0.010	0.008	0.002	-	-
Grinage Run											
GRI-1	PEM	0.070	0.070	-	-	-	0.050	0.050	-	-	-
Hoge Run											
F-16	PEM	0.009	0.009	-	-	-	0.009	0.009	-	-	-
F-19	PEM	0.025	0.025	-	-	-	0.025	0.025	-	-	-
F-21	PEM	0.052	0.052	-	-	-	0.052	0.052	-	0.000	-
F-22	PEM	0.012	0.012	-	-	-	0.012	0.012	-	-	-
F-28	PEM	0.009	0.009	-	-	-	0.009	0.009	-	-	-
F-44	PEM	0.004	0.004	-	-	-	0.004	0.004	-	-	-
F-45	95%PEM/5%PSS	0.024	0.023	0.001	-	-	0.024	0.023	0.001	-	-
F-52	PEM	0.040	0.040	-	-	-	0.040	0.040	-	-	-
HOG-3	PEM	0.168	0.168	-	-	-	0.168	0.168	-	-	-
HOGE-1	PEM	0.128	0.128	-	-	-	0.128	0.128	-	-	-
HOGE-2	PEM	0.256	0.256	-	-	-	0.256	0.256	-	-	-
R3-1	PEM	0.020	0.020	-	-	-	0.020	0.020	-	-	-
R3-2	PEM	0.022	0.022	-	-	-	0.022	0.022	-	-	-
R3-3	PEM	0.006	0.006	-	-	-	0.006	0.006	-	-	-
R3-4	90%PEM/10%PFO	0.146	0.131	-	0.015	-	0.146	0.131	-	0.015	-
R3-5	PEM	0.084	0.084	-	-	-	0.084	0.084	-	-	-
Wetland A	PEM	0.028	0.028	-	-	-	0.028	0.028	-	-	-
Wetland B	PEM	0.001	0.001	-	-	-	0.001	0.001	-	-	-
Wetland C	95%PEM/5%PSS	0.106	0.101	0.005	-	-	0.106	0.101	0.005	-	-
House Run											
F-4	PEM	0.023	0.023	-	-	-	0.023	0.023			
Wetland E	PEM	0.037	0.037	-	-	-	0.037	0.037	-	-	-
McCourtney Run											
F-73	80%PEM/20%PSS	0.181	0.145	0.036	-	-	0.007	0.007	-	-	-
Wetland F	95%PEM/5%PSS	0.023	0.022	0.001	-	-	0.023	0.021	0.001	-	-
Wetland G	90%PEM/5%PSS/5%PFO	0.012	0.010	0.001	0.001	-	0.012	0.010	0.001	0.001	-
TOTAL ACRES		**1.499**	**1.437**	**0.046**	**0.016**	**0.000**					
			TOTAL WETLAND IMPACTS				**1.305**				
					PEM Wetland Impact			**1.278**			
						PSS Wetland Impacts			**0.010**		
							PFO Wetland Impacts			**0.016**	
								POW Wetland Impacts			**0.000**

6.4.5 Compensatory Mitigation for Unavoidable Wetland Impacts

In accordance with the Compensatory Mitigation for Losses of Aquatic Resources; Final Rule (40 CFR Part 230) compensatory mitigation for unavoidable impacts to aquatic resources is proposed as part of this project.

6.4.5.1 Wetland Area Replacement

Based on USACE and PADEP wetland mitigation guidance and established replacement ratios, and the jurisdictional determinations, and because the majority of wetland impact is PEM classification (1:1 mitigation ratio), a minimum of 1.340 acres of wetlands replacement was determined for the 1.305 acres of anticipated wetland impact that will result from the project. This would represent an overall mitigation ratio of 1.03:1. At a minimum, the replacement wetland will include 1.278 acres of PEM wetland classification, 0.017 acres of PSS wetland classification, and 0.045 acres of PFO wetland classification (total of 1.340 acres). Table 6-48 provides a summary of the anticipated wetland impacts and the method used to determine replacement wetland.

FMLLC proposed to create a total of 1.415 acres of replacement wetlands on existing Alpha-owned parcels located within the House Run watershed along the mainstem and a tributary. This conceptual wetland mitigation plan provides for an increased overall wetland replacement mitigation ratio of 1.08:1 (replacement acreage to impact acreage) to help ensure proper establishment of the required wetland area.

6.4.5.2 Wetland Functional Replacement

Functional replacement will be provided at a minimum 1:1 ratio based on the functional assessment. Primary functions for replacement wetlands include Floodflow Alteration and Nutrient Removal. Secondary functions include Groundwater Discharge, Sediment Toxicant Retention, Production Export and Wildlife Habitat.

The replacement wetlands will provide Floodflow Alteration and Groundwater Discharge functions based on their low position within the landscape, association and proximity to surface waters, and depressional topography which will accept out of bank flows during flooding events and is designed to intercept the seasonally high water table present in the associated soils. The lower elevation of the wetland bottom will create the opportunity for surface expression of groundwater and potential contributions to base flows of the adjacent streams. In addition, the Sediment Toxicant Retention function will be provided through the depressional form and location of the replacement wetlands along adjacent perennial stream channels where floodflows and suspended sediments from upstream sources and in-stream erosion can be retained and attenuated. Production Export and Wildlife Habitat functions will be provided through the establishment of diverse vegetative classes (emergent, scrub shrub and forest) and the proposed plant species composition within the wetland system. Once established, many of the plants will

Table 6-48. Wetland Replacement

Wetland Identification	Cowardin Wetland Classification	USACE JURISDICTIONAL DETERMINATION	Total Acres Existing	Total Acres Impacted	PEM Acres Impacted	USACE MITIGATION REQUIREMENT 1:1 Replacement Ratio	PADEP MITIGATION REQUIREMENT 1:1 Replacement Ratio	PSS Acres Impacted	USACE MITIGATION REQUIREMENT 2:1 Replacement Ratio	PADEP MITIGATION REQUIREMENT 1.5:1 Replacement Ratio	PFO Acres Impacted	USACE MITIGATION REQUIREMENT 3:1 Replacement Ratio	PADEP MITIGATION REQUIREMENT 2:1 Replacement Ratio
Garner Run													
F-1	85% PEM/15% PSS	Jurisdictional	0.003	0.003	0.003	0.003	0.003	-	-	-	-	-	-
40649-W1	85% PEM/15% PSS	Jurisdictional	0.010	0.010	0.008	0.008	0.008	0.002	0.004	0.003	-	-	-
Grinage Run													
GRI-1	100% PEM	Isolated	0.070	0.050	0.050	-	0.050	-	-	-	-	-	-
Hoge Run													
F-16	100% PEM	Jurisdictional	0.009	0.009	0.009	0.009	0.009	-	-	-	-	-	-
F-19	100% PEM	Isolated	0.025	0.025	0.025	-	0.025	-	-	-	-	-	-
F-21	100% PEM	Isolated	0.052	0.052	0.052	-	0.052	-	-	-	-	-	-
F-22	100% PEM	Isolated	0.012	0.012	0.012	-	0.012	-	-	-	-	-	-
F-28	100% PEM	Jurisdictional	0.009	0.009	0.009	0.009	0.009	-	-	-	-	-	-
F-44	100% PEM	Jurisdictional	0.004	0.004	0.004	0.004	0.004	-	-	-	-	-	-
F-45	95% PEM/5% PSS	Isolated	0.024	0.024	0.023	-	0.023	0.001	-	0.002	-	-	-
F-52	100% PEM	Jurisdictional	0.040	0.040	0.040	0.040	0.040	-	-	-	-	-	-
HOG-3	100% PEM	Isolated	0.168	0.168	0.168	-	0.168	-	-	-	-	-	-
HOGE-1	100% PEM	Isolated	0.128	0.128	0.128	-	0.128	-	-	-	-	-	-
HOGE-2	100% PEM	Isolated	0.256	0.256	0.256	-	0.256	-	-	-	-	-	-
R3-1	100% PEM	Jurisdictional	0.020	0.020	0.020	0.020	0.020	-	-	-	-	-	-
R3-2	100% PEM	Jurisdictional	0.022	0.022	0.022	0.022	0.022	-	-	-	-	-	-
R3-3	100% PEM	Jurisdictional	0.006	0.006	0.006	0.006	0.006	-	-	-	-	-	-
R3-4	90% PEM/10% PFO	Jurisdictional	0.146	0.146	0.131	0.131	0.131	-	-	-	0.015	0.045	0.030
R3-5	100% PEM	Jurisdictional	0.084	0.084	0.084	0.084	0.084	-	-	-	-	-	-
Wetland A	100% PEM	Isolated	0.028	0.028	0.028	-	0.028	-	-	-	-	-	-
Wetland B	100% PEM	Isolated	0.001	0.001	0.001	-	0.001	-	-	-	-	-	-
Wetland C	95% PEM/5% PSS	Isolated	0.106	0.106	0.101	-	0.101	0.005	-	0.008	-	-	-
House Run													
F-4	100% PEM	Isolated	0.023	0.023	0.023	-	0.023	-	-	-	-	-	-
Wetland E	100% PEM	Jurisdictional	0.037	0.037	0.037	0.037	0.037	-	-	-	-	-	-
McCourtney Run													
F-73	80% PEM/20% PSS	Jurisdictional	0.181	0.007	0.007	0.007	0.007	-	-	-	-	-	-
Wetland F	95% PEM/5% PSS	Jurisdictional	0.023	0.023	0.021	0.021	0.021	0.001	0.002	0.002	-	-	-
Wetland G	90% PEM/5% PSS/5% PFO	Isolated	0.012	0.012	0.010	-	0.010	0.001	-	0.002	0.001	-	0.002
		TOTAL ACRES	**1.499**	**1.305**	**1.278**	**0.401**	**1.278**	**0.010**	**0.006**	**0.017**	**0.016**	**0.045**	**0.032**

The Compensatory Mitigation Acreage for Wetland Impacts has been determined through calculating the acres of mitigation using USACE and PADEP ratios for PEM/POW, PSS and PFO wetland classifications. Based on current guidance, the USACE mitigation ratios for jurisdictional (does not include isolated wetlands) wetland impacts are:

PEM and POW Impacts - 1:1 mitigation
PSS Impacts - 2:1 mitigation
PFO Wetland - 3:1 mitigation

Based on current guidance, PADEP mitigation for wetland impacts (indludes all wetland resources) are assumed to be 1:1 minimum however given the HQ designation, the following ratios were applied:

PEM and POW Impacts - 1:1 mitigation
PSS Impacts - 1.5:1 mitigation
PFO Impacts - 2:1 mitigation

TOTAL PEM IMPACTS	1.278					
USACE 1:1 PEM MIT		0.401				
PADEP 1:1 PEM MIT			***1.278***			
TOTAL PSS IMPACTS				0.010		
USACE 2:1 PSS MIT					0.006	
PADEP 1.5:1 PSS MIT						***0.017***
TOTAL PFO IMPACTS						0.016
USACE 3:1 PFO MIT						***0.045***
PADEP 2:1 PFO MIT						0.032

PEM MITIGATION REQUIRED: 1.278 (Based on PADEP requirements)
PSS MITIGATION REQUIRED: 0.017 (Based on PADEP requirements)
PFO MITIGATION REQUIRED: 0.045 (Based on USACE requirements)
TOTAL MITIGATION REQUIRED: 1.340 (Combined Maximum Requirement)

serve as food sources and habitat for a variety of insects, birds, mammals and amphibians where only limited resources (hayfield/pasture) once existed.

Due to the development of the Foundation Mine, nearly all agricultural activities and residential land uses have or will cease to exist within the local watersheds and project vicinity as the parcels are owned and managed by FMLLC. As a result, the primary sources of nutrient loading, including livestock pasturing and residential lawn and landscaping activities will cease to exist.

Therefore the opportunity and requirement to provide for the Nutrient Removal function will no longer exist.

Upon completion, all wetland mitigation areas will be protected in perpetuity through the establishment of permanent Conservation Easements in conformance with USACE and PADEP requirements and technical guidance. Detailed information pertaining to the proposed compensatory wetland mitigation is contained in Section 7.0 and Appendix F of this document.

6.5 THREATENED AND ENDANGERED SPECIES

Surface facilities associated with the Foundation Mine will not impact threatened or endangered species. The proposed project site has been subjected to PNDI (Pennsylvania Natural Diversity Inventory) investigations and, except for the water intake structure location, has been cleared regarding any potential impacts that were reported.

The project site was divided into the following seven areas for PNDI Investigation. Maps showing limits of each area are included with the correspondence presented in Appendix B. Refer to Figure 6-6 for all PNDI search areas. Investigation dates for each area are listed below. Discussions of investigation results follow.

- Water Supply Line – 8/25/2011
- Refuse Disposal Site CR-1B – 6/16/2011
- Refuse Disposal Site R3 – 8/25/2011
- Water Supply Impoundment – 8/25/2011
- Rail Spur – 8/26/2011
- Water Intake Structure – 8/25/2011
- Additional (Remaining) Surface Facilities – 6/16/2011

PNDI surveys for the **Water Supply Line, Refuse Site CR-1B, and Water Intake** S**tructure** areas indicated "No Impact" for species under the jurisdiction of: PA Game Commission, PA Department of Conservation and Natural Resources (DCNR), PA Fish and Boat Commission (PFBC), and U.S. Fish and Wildlife Service (USFWS).

PNDI surveys for the **Railroad Spur,** and the **Additional (Remaining) Surface Facilities** areas indicated a potential conflict with the *Amblyscirtes vialis* (Common Roadside Skipper) and *Fusconaia flava* (Wabash Pigtoe). Upon further review, the DCNR determined "no impact anticipated" on the Common Roadside Skipper. The PFBC determined that there could be a potential impact to the Wabash Pigtoe in the Railroad Spur area, but not in the Surface Facilities area. The PFBC stated that if the best management practices are applied and a strict erosion and sedimentation control plan is maintained, there will be no adverse impact. Best management practices will be applied and an erosion and sedimentation control plan will be submitted for approval by PADEP.

A PNDI survey for the **Coal Refuse Disposal Site R-3** area (including the associated sediment pond) indicated a potential conflict with the *Amblyscirtes vialis* (Common Roadside Skipper), *Senna marilandica* (Wild Senna), and the *Fusconaia flava* (Wabash Pigtoe). Upon further review, the DCNR determined "no impact anticipated" on the Common Roadside Skipper. The PFBC determine that there could be a potential impact to the Wabash Pigtoe. The Coal Refuse Disposal Area R-3 will eliminate the headwaters and a portion of Hoge Run. If required a mussel survey will be conducted to determine the presence of the Wabash Pigtoe. If the mussel is presence, provisions for the Wabash Pigtoe mussels to be relocated to a healthy habitat will be made prior to the development of R-3.

A PNDI survey for the **Water Supply Impoundment** permit boundary indicted a potential conflict with the *Amblyscirtes vialis* (Common Roadside Skipper). Upon further review, the DCNR determined that "no impact anticipated" on the Common Roadside Skipper.

In addition to the PNDI searches, Foundation Mining, LLC contracted Civil & Environmental Consultants, Inc. (CEC) and Pittsburgh Wildlife & Environmental, Inc. (PWE) to perform a bat survey of proposed surface facility site locations. CEC's survey included the Foundation Mine Surface Facilities, the Railroad Sidings, and both Refuse Sites CR-1B and R-3 while PWE surveyed the Water Supply Impoundment area. Approximate limits of the areas searched are presented on Figure 1 of CEC's report and the Project Location Map in PWE's report which are included in Appendix C. These reports concluded that no Indiana bats, or any other threatened or endangered bat species, were captured during the survey, which indicates no impact is anticipated. Responses from the US Fish and Wildlife Service (FWS) concurring with the CEC and PWE reports also are included in Appendix C.

6.6 SURFACE WATER QUALITY/CHEMISTRY

The proposed project site is located in the southwestern quadrant of the South Fork Ten Mile Creek watershed, within an area drained primarily by McCourtney Run and three of its tributaries - Garner Run, House Run, and Hoge Run. Additional unnamed tributaries to these streams drain the area as well. All streams within the project area are classified by PADEP as High Quality Warm Water Fishes (HQ-WWF).

Surface water quality within the project site has been established via analytical testing of chemical properties, and through biological monitoring. This section discusses surface water quality as indicated by water chemistry. Stream quality established by biological monitoring, including pH, dissolved oxygen, and conductivity determinations made as part of that work, is discussed under Section 6.3.

Analytical results for one sampling location on each of the main tributaries as well as the unnamed tributary within the coarse/combined coal refuse site CR-1B were selected as representative of area water quality. Refer to the sampling point location plan presented as Figure 6-7. Sampling locations for House Run and Hoge Run are just above their confluence with McCourtney Run. Similarly, the sampling location for the unnamed tributary is just

upstream of its confluence with House Run. Garner Run was sampled upstream of the proposed Pittsburgh seam shaft pad area; McCourtney Run, was sampled just downstream of its confluence with Hoge Run. Sampling point names and sampling periods, along with a summary of the analytical results, are presented on Table 6-49. The frequency of sampling for periods presented on Table 6-49 generally was monthly.

Analytical results indicate: pH within the neutral range; low concentrations of the metals iron, manganese, and aluminum; sulfate concentrations not exceeding 42 mg/l; and conductivity values at, or below, 461 micromhos/cm. Ranges in constituent concentrations represented by the test results are presented on Table 6-49. Note, the high metal values (iron, manganese, and aluminum values) reported for Garner, McCourtney, and Hoge Runs are a one-time spike during the sampling period. If these test results were removed from the reported ranges, high values for the three streams would be less than or equal to 0.53 mg/l for iron, 0.55 mg/l for manganese, and 0.48 mg/l for aluminum.

Drainage and runoff from surface activity sites will be handled as noted below to prevent stream water quality impacts.

Stormwater Discharge from Earth Disturbances. Runoff from site surface facilities generally will pass through sediment control structures (e.g., sediment traps, ponds, etc.) before being discharged to minimize sedimentation of the receiving stream. Prior to construction of the slurry impoundment and/or freshwater impoundment, runoff collected in the sediment ponds will be treated with flocculants/coagulants, if required, and discharged manually to nearby streams over a period of 4 to 7 days. Following slurry impoundment and/or freshwater impoundment construction, water collected in the ponds will be pumped to one of these two impoundments to avoid discharges to nearby streams.

Stormwater Discharge From Permanent Facilities. Runoff that contacts coal will pass through a coal fines containment sump and discharge into a sedimentation/treatment pond. Before the slurry impoundment is constructed, runoff collected in each pond will be treated with flocculants/coagulants to promote sediment precipitation and the treated water will be discharged manually to nearby streams over a period of 4 to 7 days in accordance with NPDES requirements. Following slurry impoundment construction, water from each pond will be evacuated between 4 and 7 days by pumping into the slurry impoundment or will be pumped to a discharge point located in a non-HQ watershed.

Pumped Mine Water Discharge. Pumped mine water discharge is expected to be negligible during slope and shaft construction. Based on experience at Cumberland Mine, mine discharges generated from development and construction of the Foundation Mine shaft and slope are expected to be approximately 2 gpm and 3 gpm, respectively. Water inflow into the mine during development mining also is anticipated to be negligible based on experiences at Emerald and

Table 6-49. Surface Water Chemistry

Stream Sampling Point Sampling Period(s)	House Run 2A Nov 07 - Sep 09		UNT to House Run ST26-3034 Dec 06 - Jan 07 Nov 07 - Mar 09		McCourtney Run 1 Sep 07 - Oct 09		Garner Run ST63-3041 Jan - Feb 07 7-Nov Aug 08 - Feb 09		Hoge Run ST22-3043 Dec 06 - Jan 07 Apr 07 - Oct 07 Jan 08 - Mar 09	
	Min- Max	**Avg.**	**Min- Max**	**Avg.**	**Min- Max**	**Avg.**	**Min- Max**	**Avg.**	**Min- Max**	**Avg.**
Flow (GPM)	0 - 5194.3	566.2	0 - 425.0	41.1	1.4 - 11041.2	1766.9	0.9 - 19870	1892.7	1.1 - 3568.5	369.6
Temperature (°C)	1.40 - 24.30	13.68	3.20 - 22.90	10.6	1.30 - 24.50	14.14	0.60 - 22.80	11.07	1.40 - 23.50	14.4
pH (field)	7.58 - 8.82	7.93	7.15 - 8.38	7.75	7.51 - 8.70	8.02	6.75 - 8.70	7.37	6.91 - 8.99	7.86
pH (lab)	6.50 - 8.26	7.68	6.51 - 7.87	7.27	6.86 - 8.10	7.56	6.55 - 7.79	7.78	6.50 - 8.24	7.5
Alkalinity (mg/l)	33.19 - 125.85	75.67	31.09 - 70.64	53.1	38.99 - 128.34	84.07	35.19 - 125.81	80.99	40.66 - 119.43	79.39
Acidity (mg/l)	(-101.18) - (-16.25)	-52.22	(-46.51) - (-23.33)	-32.8	(-95.84) - (-19.68)	-56.39	(-87.65) - (-20.74)	-58.87	(-86.02) - (-24.53)	-54.56
Iron (mg/l)	0.03 - 0.45	0.16	0.03 - 0.43	0.2	0.1 - 1.32	0.27	0.08 - 1.09	0.31	0.02 - 2.1	0.28
Manganese (mg/l)	<0.02 - 0.33	0.04	<0.02 - 0.04	0.01	<0.02 - 0.35	0.06	<0.02 - 0.08	0.04	<0.02 - 1.36	0.19
Aluminum (mg/l)	<0.02 - 0.32	0.13	<0.02 - 0.24	0.1	0.04 - 0.66	0.2	0.06 - 1.16	0.25	<0.02 - 0.37	0.92
Sulfate (mg/l)	15.0 - 42.0	23	22.0 - 42.0	28	19 - 37	25	20 - 38	28.11	19 - 29	25
Suspended Solids (mg/l)	<1.0 - 9.0	1.7	<1.0 - 15.0	4	<1.0 - 47.0	4.5	<1.0 - 84	20.4	<1.0 - 41	5.8
Spec. Cond. (micromhos/cm)	123 - 331	206	83 - 207	164	148 - 407	252	157 - 461	199.5	140 - 310	224

Cumberland Mines. Groundwater inflow (mine water) is not likely to increase until a longwall panel is mined and subsidence has fractured overlying strata thus allowing groundwater to migrate into the mine. The maximum volume of water expected to be pumped from the mine after longwall mining has commenced is estimated to be 500 gpm. Initially, during construction of the shaft and slope and subsequent development mining, when influx of water in the mine workings is low, mine water will be pumped into two treatment ponds, one at the shaft site and the other at the slope site. The water will be treated and then carried by water hauling trucks to an approved disposal facility until the slurry impoundment is operational. Once the slurry impoundment is operational the treated mine water will be pumped to the slurry impoundment. Alternatively a bleeder shaft will be constructed near the beginning of the first longwall panel and the mine water will be pumped via the bleeder shaft (and associated sediment control structure) into a non-HQ watershed or to the slurry impoundment.

6.7 CULTURAL RESOURCES

Surface facilities proposed for the Foundation Mine will not impact archaeological or historic resources based on results of Phase I Cultural Resource Survey work performed by Christine Davis Consultants (CDC). Pennsylvania Historical and Museum Commission (PHMC) has confirmed CDC's findings and cleared the project site regarding the potential for cultural resource impacts.

The project site was divided into six areas and each area was investigated by CDC for the presence of cultural resources. Presented in Appendix D is an abstract of the investigation report developed by CDC for each area along with the response letter from PHMC regarding CDC's findings. Presented as Figure 6-8 is a map showing limits of the six areas investigated along with corresponding report/PHMC clearance dates.

The results of the surveys indicated two areas, the Water Impoundment and Area V, are clear of archeological and historic artifacts. Three areas, Area I, Area II, and Area IV, have not been cleared due to CDC's historic findings. Refer to Appendix D for the sites eligible for the National Register. Three areas, Water Impoundment Stockpiles & Access Road, CRDA R-3 Expansion, and CRDA CR-1B, have been surveyed and are pending PHMC's response.

6.8 FLOODPLAIN MANAGEMENT

Identification of floodplains that will be affected by the proposed project activity is required by Presidential Executive Order, E.O. 11988, Sec. 2(a)(4). Officially designated floodplains and floodways are identified based on mapping provided by the National Flood Insurance Program. This program has been established by the Federal Emergency Management Agency (FEMA) and is administered and enforced through local governments. For the purpose of the Flood Insurance Program, a floodway is defined as the stream channel plus any adjacent floodplain areas that must be kept free of encroachment in order that the 100-year flood can be carried without substantial increases in flood elevations.

FEMA publishes Flood Insurance Studies for local communities to investigate the existence and severity of flood hazards. FEMA also produces Flood Boundary and Floodway Maps which delineate floodplains and floodways, and Flood Insurance Rate Maps (FIRM), which provide flood rate zones and estimated flood elevations. FEMA information for Center and Jackson Township, Greene County was reviewed to determine the limits of designated floodplains and floodways within the proposed permit area.

Center and Jackson Township do not have a Flood Insurance Study, which indicates there are no significant flood hazards in these townships. Four main streams within our project area, House Run, Hoge Run, Garner Run, and McCourtney Run are designated as Zone A as shown on the Flood Insurance Administration (FIA) Flood Hazard Boundary Maps presented in Appendix E. FEMA defines Zone A as an "area of special flood hazard without water surface elevations determined". There are no designated floodways for any stream in Center or Jackson Township. Furthermore, the Flood Hazard Boundary Maps also indicate that no floodways have been established along South Fork Tenmile Creek (the receiving stream from the project areas) for the entire length of the community.

Proposed construction will occur within the 100-year floodplain of House, Hoge, Garner, and McCourtney Runs as indicated on Figure 4-1. As a result, hydraulic analyses were performed to establish the current 100-year floodplain level for each stream and the level that will exist after mine facilities are constructed. The HEC-RAS models were developed in compliance with the National Flood Insurance Program (NFIP), Subparagraph 65.6(a)(2), which requires a 0.5 foot tie in to the effective water-surface profile at the upstream and downstream ends of the revised stream. Because an effective water-surface profile is not available for these streams the 0.5 foot tie-in is relative to existing conditions.

Results of the analyses indicate mine facilities (e.g., mine openings, pad areas, etc.) will be located above the 100-year floodplain level and proposed construction will not cause a significant increase in 100-year floodplain levels on adjacent upstream property not owned by the applicant. Proposed activities along House Run will cause up to a 4.4-foot increase the 100-year floodplain level within the project site, but will tie-in at only a 0.28-foot increase before the upstream property line of FMLLC. The 100-year floodplain level along Garner and McCourtney Runs will decrease in elevation after proposed construction. The Hoge Run 100-year floodplain level will increase up to 4.8 feet in the vicinity of the proposed slope pad, but will be contained within the proposed 25-foot wide stream relocation corridor between the pad and Hoge Run Road. FMLLC owns the property along Hoge Run upstream of the slope pad area and plans to develop the area as a coal refuse disposal impoundment; therefore, flooding of this area is not a concern.

The proposed activity has a potential to increase peak discharges from disturbed areas and cause localized flooding due to changes in ground cover (higher runoff coefficients) and decreases in travel time. However, the mine facilities include ponds and impoundments so that peak discharge rates from the project area will be at, or below, the existing conditions peak discharge rates. Sedimentation ponds will be provided to reduce stream siltation. Each sedimentation pond has been designed to provide storage capacity in accordance with 25 PA Code Chapter 102 requirements. These ponds will aid in the reduction of peak flow rates for the surface water

runoff as well as minimize sediment pollution downstream. In addition to the sedimentation ponds, a proposed slurry impoundment, and water supply impoundment will reduce peak discharges downstream to Hoge Run and Garner Run, respectively. These facilities will be designed to store as much surface runoff as practical to provide an adequate water supply for the proposed mining operations.

After final reclamation, all areas except the batch weigh area and coal refuse disposal areas, will be returned to approximately original grade, re-vegetated, and the peak discharges returned to existing conditions levels.

A water intake structure will be constructed as part of this project to pump water from South Fork Tenmile Creek to the water supply impoundment. A low flow weir will be constructed across South Fork Tenmile Creek as part of the water intake structure. This weir will cause an increase in water elevations upstream, but the increase is expected to be limited to a few feet or less, and is expected to be limited to a relatively short distance upstream of the weir. Water level increases will occur in undeveloped areas and will not impact any structures. Furthermore, FMLLC will own or lease the land on both sides of the segment of South Fork Tenmile Creek that will be impacted.

6.9 SAFETY OF IMPOUNDMENT STRUCTURES

Impoundments associated with the proposed mine facilities are being designed by certified registered professional engineer(s) with Michael Baker Jr., Inc. (Baker) of Moon Township, Pennsylvania. Their construction will be certified by registered professional engineer(s) with Baker or another professional engineer retained by FMLLC. Baker has considerable experience with impoundment design particularly sedimentation ponds and coal refuse disposal areas (i.e., slurry impoundments). They are recognized as experts with this type of design.

Impoundment designs will conform to applicable state and federal dam safety criteria. The slurry impoundment, water supply impoundment, and large sedimentation ponds will require dam permits/approvals issued by PADEP Division of Dam Safety and Mine Safety Health Administration (MSHA).

6.10 MINERAL AND ENERGY NEEDS AND CONSERVATION

Several factors contribute to the demand for energy sources such as coal, oil, and natural gas. The demand for these fuels is inextricably linked and contingent on variables such as availability, demand for electricity, environmental regulation, and weather. The demand for electricity, in particular, has an effect on the demand for coal. An increasing demand for electricity indicates that the supply of coal must be increased to meet projected demands. Foundation Mine will help to meet the nations demand for energy by increasing the supply of coal.

Much of the information presented below is derived from the Department of Energy (DOE), Energy Information Administration's (EIA) Annual Energy Outlook 2010 Report. The EIA, an independent statistical and analytical agency within the DOE, generates forecasts using the National Energy Modeling System. Forecasting by the EIA is used in analytical studies for the U.S. Congress and other DOE offices.

Increasing coal use for electricity generation, along with the startup of several CTL (Coal-to-Liquids) plants, is expected to lead to growth in coal production averaging 0.2 percent per year from 2008 to 2035. Of all the coal consumed in 2008, 92 percent was used for electricity generation. That share is expected to decrease slightly to 89 percent by 2035 with the development and implementation of renewable energy and natural gas for power generation. Nevertheless, coal-fired plants are expected to remain the key source of electricity through 2035. Coal accounted for 48 percent of U.S. electricity generation in 2008 and is projected to account for 44 percent in 2035. Pressure to keep coal prices low will shift more production to mines with higher labor productivity, such as underground longwall mines.

6.11 WATER SUPPLY AND CONSERVATION

It is unlikely Foundation Mine surface facility operations will decrease the quantity of a water supply, or interrupt a water source currently being used for domestic, agricultural, industrial, or other legitimate purpose. The nearest public water supply downstream, Tri-County Joint Municipal Authority Public Water Supply, is more than 24 miles from the proposed project site. Private water supplies within the proposed project site are owned by FMLLC and residences adjacent to the project site obtain their water from wells and springs rather than surface water.

As indicated in Section 4.6 (Water Supple System), coal cleaning operations and underground mining equipment operation will require water at a rate of approximately 1700 gallons per minute. Water needed for coal mining and processing will be obtained from a fresh water impoundment to be constructed within a valley south of Holbrook. Runoff collected by the impoundment will be supplemented with water withdrawn from South Fork Ten-Mile Creek. The water intake structure location has been finalized, but the design has not been prepared. The water intake structure will be designed to meet PA Fish and Boat Commission requirements that a minimum stream base flow of 25% of the average daily flow be maintained. No water will be withdrawn from South Fork Tenmile Creek if the stream flow is below this value. Consequently, stream flow will be maintained.

Excavation for shafts and slopes have potential to interrupt adjacent private water supplies, but at the Foundation Mine site they are not expected to cause an impact. Not only is the nearest water supply to the shaft sites at a distance of more than 1,350 feet, but the shafts will be pre-grouted to the mine level and lined. Slope excavations also will be lined. The nearest water supply to a slope excavation, a private well, is within approximately 170 feet measured horizontally from the proposed Pittsburgh slope alignment. However, the slope will be at a level approximately 480 feet below the ground surface elevation reported at the well location (~432 feet below the well's reported static water level of 48.2 feet).

Proposed disposal areas will be valley fill type facilities; however, stream base flows will be carried under the disposal areas in rock drains. The disposal facilities will be designed and constructed to maintain stream base flows and to reduce impacts to area water quality.

6.12 RECREATION

There are no public or organized recreation opportunities within the proposed permit area. Further, the project permit area is not within or in close proximity to the following:

- Boundaries of the National Park System,
- Boundaries of the National Wildlife Refuge System,
- Boundaries of the National System of Trails,
- Boundaries of the National Wilderness Preservation System,
- Boundaries of the Wild and Scenic Rivers System,
- Boundaries of any National Forest,
- Boundaries of any National Recreation Area,
- Boundaries of the Pennsylvania Park System,
- Boundaries of Pennsylvania Forest Picnic Areas,
- Boundaries of the Pennsylvania game land system,
- Boundaries of the Pennsylvania Scenic River System,
- Boundaries of any public park.

Casual recreational uses of the property include occasional hunting and the riding of all-terrain vehicles. The land is private property and the owner controls additional acreage outside the permit boundary. Thus, the only recreational activities that could be impacted are hunting or all-terrain vehicle riding, which, if currently occurring, are being conducted on Foundation property.

Fishing is not supported in the permit area. The tributaries and streams within the permit area do not sustain fish desired by sport fishermen. Thus, no negative impacts affecting local recreational fishing are anticipated by the proposed project undertaking.

6.13 PROPERTY OWNERSHIP

All property within the proposed project boundary is owned by FMLLC (a.k.a. PA Land Holdings. Properties within the proposed project boundary and owned by Pennsylvania Lines LLC will be leased to FMLLC to facilitate the proposed rail siding construction and the operation of the facility. Refer to Figure 2-2 for the project overview plan and property ownership. Properties adjacent to the proposed project site are listed in Table 6-50 along with property owner name and address. Owners of properties that adjoin waterbodies to be impacted by development of the Foundation Mine surface facilities are:

- PA Land Holding
  PO Box 1020
  Waynesburg, PA 15370
- Pennsylvania Lines, LLC
  110 Franklin Rd SE,
  Roanoke, VA 24042

Table 6-50. Property Owners Adjoining the Project Site

Parcel	Owner	Address
03-04-109	PA Land Holdings	157 Portal Rd, PO Box 1020, Waynesburg, PA 15370
03-04-109C	PA Land Holdings	158 Portal Rd, PO Box 1020, Waynesburg, PA 15370
03-04-109F	Ramona Petros	203 4th St, Waynesburg, PA 15370
03-04-109B	Mark J. Golacinski	144 Church Hill Rd, Holbrook, PA 15341
03-04-110	S. Burdette Carpenter	923 N Richhill St., Waynesburg, PA 15370
03-03-142	S. Burdette Carpenter	923 N Richhill St., Waynesburg, PA 15370
03-04-121	S. Burdette Carpenter	923 N Richhill St., Waynesburg, PA 15370
03-04-115	PA Land Holdings	158 Portal Rd, PO Box 1020, Waynesburg, PA 15370
03-04-116	PA Land Holdings	158 Portal Rd, PO Box 1020, Waynesburg, PA 15370
03-04-118	PA Land Holdings	158 Portal Rd, PO Box 1020, Waynesburg, PA 15370
03-04-113	PA Land Holdings	158 Portal Rd, PO Box 1020, Waynesburg, PA 15370
03-04-124A	PA Land Holdings	158 Portal Rd, PO Box 1020, Waynesburg, PA 15370
03-04-125	PA Land Holdings	158 Portal Rd, PO Box 1020, Waynesburg, PA 15370
03-05-100	PA Land Holdings	158 Portal Rd, PO Box 1020, Waynesburg, PA 15370
03-05-101	PA Land Holdings	158 Portal Rd, PO Box 1020, Waynesburg, PA 15370
03-05-115A	Pennsylvania Lines, LLC	110 Franklin Rd SE, Roanoke, VA 24042
03-05-116A	Roger S. Bristor	2935 Golded Oaks Rd., Rogersville, PA 15359
03-05-117	PA Land Holdings	158 Portal Rd, PO Box 1020, Waynesburg, PA 15370
03-05-119B	Robert P. Vitolo	2966 Golden Oaks Rd, Rogersville, PA 15359
03-05-119C	Robert P. Vitolo	2966 Golden Oaks Rd, Rogersville, PA 15359
03-05-119	Paul E. Crouse	2963 Golden Oaks Rd, Rogersville, PA 15359
03-05-122	Green Hill Coal Co.	1000 Consol Energy Drive, Canonsburg, PA 15317
03-05-122A	PA Land Holdings	158 Portal Rd, PO Box 1020, Waynesburg, PA 15370
03-05-123	PA Land Holdings	158 Portal Rd, PO Box 1020, Waynesburg, PA 15370
03-05-124	Donald E. Main Jr.	3189 Golden Oaks Rd., Rogersville, PA 15359
03-05-124A	Johnathan D. Coote	3236 Golded Oaks Rd., Rogersville, PA 15359
03-05-125	West Greene School Dist.	1367 Hargus Creek Rd, Waynesburg, PA 15370
03-05-125A	West Greene School Dist.	1367 Hargus Creek Rd, Waynesburg, PA 15370
03-05-126	West Greene School Dist.	1367 Hargus Creek Rd, Waynesburg, PA 15370
03-05-127	Pennsylvania Lines, LLC	110 Franklin Rd SE, Roanoke, VA 24042
03-05-400	Stephen J. Dynzer	136 Center Highlands Rd, Waynesburg, PA 15370
03-05-402	Douglas R. Martin	327 Bahia Ave., Hershey, PA 17033

Table 6-50. Property Owners Adjoining the Project Site (cont.)

Parcel	Owner	Address
03-05-405	Douglas R. Martin	327 Bahia Ave., Hershey, PA 17033
03-05-412	Walter R. Young	249 Center Highlands Rd, Waynesburg, PA 15370
03-05-414	Walter R. Young	250 Center Highlands Rd, Waynesburg, PA 15370
03-05-415	Walter R. Young	250 Center Highlands Rd, Waynesburg, PA 15370
03-05-134	PA Land Holdings	158 Portal Rd, PO Box 1020, Waynesburg, PA 15370
03-05-135	PA Land Holdings	159 Portal Rd, PO Box 1020, Waynesburg, PA 15370
03-09-104	Donald E. Main Jr.	3189 Golded Oaks Rd., Rogersville, PA 15359
03-09-104A	Johnathan D. Coote	3236 Golded Oaks Rd., Rogersville, PA 15359
03-09-105	Johnathan D. Coote	3236 Golded Oaks Rd., Rogersville, PA 15359
03-09-105 RW	Pennsylvania Lines, LLC	110 Franklin Rd SE, Roanoke, VA 24042
03-09-106	Commonwealth of PA DOT	825 North Fallatin Ave. Ext, Uniontown, PA 15401 (District 12)
03-09-107	David Harry Smith	3147 W. Roy Furman Hwy, Waynsburg, PA 15370
03-09-107B	Brandon M. Smith	3065 W. Roy Furman Hwy, Waynsburg, PA 15370
03-09-107 R/R	Pennsylvania Lines, LLC	110 Franklin Rd SE, Roanoke, VA 24042
13-01-120	Michael G. Sawezyszyn	300 Gilkeson Rd, Eighty-Four, PA 15330
13-06-124	PA Land Holdings	158 Portal Rd, PO Box 1020, Waynesburg, PA 15370
13-06-125	PA Land Holdings	158 Portal Rd, PO Box 1020, Waynesburg, PA 15370
13-06-126	Brian R. Jackson	715 Grinnage Run Rd, Waynesburg, PA 15370
13-06-127	PA Land Holdings	158 Portal Rd, PO Box 1020, Waynesburg, PA 15370
13-06-127A	Judith M. Streit	657 Grinnage Run Rd, Waynesburg, PA 15370
13-06-129	PA Land Holdings	158 Portal Rd, PO Box 1020, Waynesburg, PA 15370
13-06-115	Faye J. Grimes	2250 Golden Oaks Rd, Holbrook, PA 15341
13-06-118B	Daryl L. Chaney	1839 Golden Oaks Rd, New Freeport, PA 15362
13-16-118A	Methodist Protestant Church	RD 1, Holbrook, PA 15341
13-06-122A	PA Land Holdings	158 Portal Rd, PO Box 1020, Waynesburg, PA 15370
13-06-123	PA Land Holdings	158 Portal Rd, PO Box 1020, Waynesburg, PA 15370
13-06-125	PA Land Holdings	158 Portal Rd, PO Box 1020, Waynesburg, PA 15370
13-06-124B	PA Land Holdings	158 Portal Rd, PO Box 1020, Waynesburg, PA 15370
13-06-124	PA Land Holdings	158 Portal Rd, PO Box 1020, Waynesburg, PA 15370
13-01-118	PA Land Holdings	158 Portal Rd, PO Box 1020, Waynesburg, PA 15370
13-01-119	PA Land Holdings	157 Portal Rd, PO Box 1020, Waynesburg, PA 15370
13-01-119B	PA Land Holdings	158 Portal Rd, PO Box 1020, Waynesburg, PA 15370
13-01-126	PA Land Holdings	158 Portal Rd, PO Box 1020, Waynesburg, PA 15370

Section 7.0

CONCEPTUAL COMPENSATORY MITIGATION PLAN (EXECUTIVE SUMMARY)

7.1 PROJECT OVERVIEW

Foundation Mining, LLC, a subsidiary of Alpha Natural Resources, intends to develop a bituminous coal mine in the west- central part of Greene County, PA. Development of the Foundation Mine Complex, herein referred to as the Project, will extract bituminous coal from existing FMLLC reserves using longwall mining techniques and will require construction of various surface facilities to support mine development and operation throughout the anticipated 20-year life of mining. The proposed surface facilities include:

- Coal Refuse Disposal Area R3
- Coal Refuse Disposal Area CR-1B
- Surface Facility / Prep Plant (includes Pittsburgh slope and shaft pad)
- Water impoundment and access road
- Freshwater Intake line routing and intake / pump house site
- Batch Weigh and Railroad Sidings

The Project area associated with mine development will encompass approximately 1,900 acres located in Center and Jackson Townships, Greene County, PA. Refer to Figure 1, Appendix F, Project Location Map. Based on the proposed site designs, approximately 950 acres of the Project area will be disturbed during site preparation and operation of the new mine facilities. As a result, construction and operation of the facilities will result in temporary and permanent impacts to Waters of the United States (WOUS) in the form of dredging (excavation) and the placement of rock and soil fill within streams and wetlands that exist within the Project area. The Conceptual Compensatory Mitigation Plan presented as Appendix F has been prepared to offset permanent impacts to WOUS that are anticipated to result from project developments. Presented in this section is an executive summary of the proposed mitigation plan.

Guidance from the *Compensatory Mitigation for Losses of Aquatic Resource, Final Rule* (33 CFR Parts 325 and 332 and 40 CFR Part 230, USEPA and USACE, 2008) was used to create the mitigation plan. Mitigation proposed for this project is referred to as "Permittee-Responsible" mitigation, the most common type of compensation used for projects of this nature in Pennsylvania. This type of mitigation is conducted by the permittee who retains responsibility to complete and monitor the mitigation site per conditions set forth in the permit. Typically, the mitigation activity is in-kind and located as close as possible to the impact site. In this case all of the proposed stream and wetland mitigation sites are located within the same watershed (McCourtney Run) along tributaries and mainstem streams both upstream and downstream of the proposed mine development activities. The sub-watersheds, including McCourtney Run, drain to Hargus Creek and then on to South Fork Tenmile Creek at the northernmost extent of the Project area.

7.2 PROJECT AREA STREAM IMPACTS AND DETERMINATION OF JURISDICTIONAL STREAM LENGTHS

7.2.1 Stream impacts

Based on the preferred alternative design, proposed mine surface facility development activities will impact a total of 57,895 linear feet (LF) of streams across all stream classifications (ephemeral, intermittent, perennial) throughout the project area. This total does not include 807 LF of Hoge Run that will be lost by relocation. Of the total, proposed impacts to ephemeral channels comprise 22,593 LF; intermittent channel impacts comprise 5,295 LF; and perennial stream impacts comprise 30,007 LF. The impacts to perennial and intermittent streams will eliminate, through placement of fills and/or excavation (cut), approximately 3.4 acres of existing aquatic (perennial and intermittent stream bed) habitat that is provided within the existing stream beds.

7.2.2 Jurisdictional Streams – Determination of Impact Lengths Requiring Mitigation

Based on consultation with representatives at PADEP and USACE, differential jurisdiction of the project area streams were dependent on a number of factors including the USACE jurisdictional determination for WOUS within the entire 404 Permit area, the PADEP-CDMO determination of jurisdiction for only the permanent mining activity associated impacts to waters of the Commonwealth and PADEP-SWRO determination of jurisdiction for only the non-mining (the railroad siding) related impacts to waters of the Commonwealth. Through consultation the following state and federal agency jurisdictional assertions for streams and wetlands were determined:

- PADEP- CDMO indicated that mitigation for permanent stream impacts associated with the coal refuse areas (CR-1B and R3) and water impoundment would be necessary to satisfy their mitigation requirements. Mitigation was waived for stream impacts resulting from the "temporary" impacts from surface facilities (prep plant, shaft and slope pads, stockpiles and associated facilities) in areas where the cut and fill embankments would be returned to "approximate original grades". Mitigation was also waived for surface facility impacts to those waterways that possessed less than 100 acres drainage area.

- Both PADEP-CDMO and USACE indicated the proposed Hoge Run Relocation (Natural Stream Channel Design) would provide 1:1 stream mitigation for 4,924 LF of Hoge Run impacts. (The relocation length of 4,924 LF is not reflected in the jurisdictional stream impact totals as this stream.)

- In addition to impacts associated with development of the surface facilities, both PADEP-CDMO and USACE require compensatory mitigation for the 807 LF of Hoge Run stream loss that will result from the channel relocation. Mitigation for the 807 LF is provided in the creation of additional stream length (approximately 420 LF) that will result from the stream restoration activities along with additional restoration of degraded perennial streams within the project area and adjacent subwatersheds.

- PADEP-CDMO indicated that stream impacts associated with the surface facilities (except the Batch Weigh area) would not require mitigation. All wetlands impacts resulting from the development of surface facilities however would require mitigation.

- USACE indicated that compensatory mitigation would be required for stream and wetland impacts associated with development of all of the surface facilities, except Non-Relatively Permanent Waters (NRPW) streams that did not discharge to perennial streams and isolated wetlands.

- PADEP-CDMO indicated that permitting and mitigation for stream impacts associated with the railroad siding developments would be accomplished through PADEP, Southwest Regional Office (PADEP-SWRO).

- Based on past experience with PADEP – SWRO, compensatory stream mitigation will be required for all stream impacts related to the railroad development and batch weigh load-out, and no waivers from mitigation of wetlands or streams, regardless of classification, will be granted. Payment into the PADEP Wetland Replacement Fund will likewise not be a viable mitigation option.

In consideration of these conditions, FMLLC calculated jurisdictional stream lengths for all three regulatory entities (USACE, PADEP-CDMO and PADEP-SWRO) (Table 7-1).

Table 7- 1. Determination of Jurisdictional Stream Length (Impacts)

Jurisdictional Stream Length - Impacts				
Stream Classification	PADEP-CDMO Jurisdictional Streams [1] (LF)	PADEP-SWRO Jurisdictional Streams [2] (LF)	USACE Jurisdictional Streams [3] (LF)	Total Stream Impacts Entire Project Area [4] (LF)
Impacts				
Perennial*	16,294	464	29,901	30,007
1- Total Perennial with Hoge Run Stream Loss (807 LF)	17,101	na	30,708	30,814
2 - Intermittent	2,581	100	5,218	5,295
3 - Ephemeral	12,923	1,447	18,456	22,593
Total Jurisdictional Stream Length (1+2+3)	32,605	2,011	54,382	58,702

** does not include the Hoge Run Relocation of 5,731 LF, 4,924 LF relocated to new stream channel - 807 LF lost in relocation*

[1] *Impacts associated with the CR1B, R3 Refuse Area, Water Impoundment and Batch Weigh Facility only; all others contained less than 100 acres drainage qualifying for the waiver or were considered temporary by PADEP-CDMO during SMCRA permit preparation and will require restoration to pre-mining grades.*

[2] *Impacts associated with the Railroad Sidings and Batch Weigh only; PADEP-SWRO jurisdiction is limited to these non-coal project areas per coordination and arrangement with PADEP-CDMO.*

[3] *Total of all impacts excluding temporary impacts for waterline installation and NRPW (no significant nexus) streams throughout the project area (ephemerals draining to uplands or seasonal RPW streams (intermittent))*

[4] *Total stream impact length and jurisdictional length requiring mitigation do not coincide due to jurisdictional determination and significant nexus, not all stream impacts fall under state or federal jurisdiction and as such do not require compensatory mitigation.*

In all cases regardless of stream classification, the USACE jurisdictional stream length was determined to be the greatest and would be the determining factor for required stream mitigation and the mitigation proposal and development of the Conceptual Compensatory Mitigation Plan.

7.3 COMPENSATORY MITIGATION - PROPOSED STREAM RELOCATION, RESTORATION, CREATION AND STREAM PRESERVATION

In order to provide commensurate mitigation for impacts to all three stream classes; perennial, intermittent and ephemeral, FMLLC proposes a multi-faceted mitigation strategy utilizing both traditional steam restoration and stream creation activities to offset the perennial stream impacts; and headwater stream preservation efforts to offset the ephemeral and intermittent stream impacts.

7.3.1 Comprehensive/Watershed-Wide Stream Mitigation Strategy

The multifaceted mitigation approach provides a comprehensive watershed-wide mitigation strategy by accomplishing 3 primary goals:

1) restoring degraded, higher-order, low-gradient perennial streams within the project area, vicinity and receiving watersheds. These streams have been impacted by recent and current agricultural, residential and other anthropogenic activities including deforestation of the riparian area and unrestricted livestock access to streams and;

2) creating additional, new perennial stream channel and associated aquatic habitat (stream bed) through the reconstruction of currently degraded stream channel and resultant increased sinuosity and;

3) preserving, in their entirety, existing, high-gradient, predominantly forested, tributary HQ and EV watersheds and stream systems adjacent to the Project area, Figure 2, Appendix F, HQ watershed preservation would occur in three subwatersheds of Garner Run (40643) including stream 40643-C, 40651 and 40650, located south of the proposed water impoundment along the west side of Golden Oaks Road (S.R. 0018). EV watershed preservation is proposed for 2 subwatersheds of Hoge Run including the watershed of UNT 40633 and 40634 located north of Hoge Run Road; and 3 subwatersheds of House Run (40635) including the upper watershed of UNT 40638, a lower tributary of 40638 and stream 40640 in the vicinity of the intersection of Macedonia and Bristoria Roads.

7.3.2 Jurisdictional Ephemeral and Intermittent Stream Mitigation

Per the jurisdictional stream determination process presented in Section 7.1.2, the USACE jurisdictional stream impact length for ephemeral and intermittent streams (Non-Relatively Permanent Waters (NRPW) with significant nexus to Relatively Permanent Waters (RPWs) and Seasonal Relatively Permanent Waters (RPWs) respectively) was determined to be the greatest. By satisfying the much greater USACE stream mitigation requirement, FMLLC expects that the PADEP-CDMO and PADEP-SWRO stream mitigation requirements will be satisfied.

Mitigation of ephemeral and intermittent impacts using traditional stream restoration approaches is difficult to assess and quantify due primarily to the fact that neither intermittent or ephemeral steams provide persistent aquatic habitat, flows/ hydrology, nutrient conveyance or sediment transport functions that perennial streams provide. In addition, establishing an appropriate ratio or mitigation quantity (length, stream bed area) for ephemeral and intermittent streams that is commensurate in terms of perennial stream restoration is equally challenging. As a result, FMLLC proposes to offset the anticipated impacts to Ephemeral and Intermittent streams, by providing headwater stream preservation within existing EV and HQ designated watersheds located adjacent to and that contribute to the project area mitigation streams. Additionally, the headwater stream areas coincidentally occur within parcels owned by an affiliate to FMLLC (PA Land Holdings Company). The parcel ownership will allow FMLLC to set aside virtually the entire watershed for each of the HQ and EV stream systems.

The goal is to provide ephemeral stream preservation length at a minimum 1:1 ratio compared to ephemeral stream impacts and a combined HQ and EV intermittent and a minimum 4:1 ratio of perennial and intermittent stream preservation length to intermittent stream impacts. To meet a portion of the goal, HQ preservation is proposed in 3 subwatersheds of Garner Run (40643).

Table 7-2. Proposed HQ Stream Preservation Length for Mitigation

Proposed HQ Preservation Area Garner Run Tributaries		**G3**	**G4**	**G5**	***TOTAL HQ PRESERVATION***
Preservation Stream Lengths by Classification (LF)	*Ephemeral*	5,336	-	-	***5,336***
	Intermittent	2,828	-	-	***2,828***
	Perennial	-	-	-	***0***
	*Unclassified**	-	2,529	1,118	***3,647***
Total Preserved Stream Length (LF)		8,164	2,529	1,118	***11,811***
Total Preservation Acres and Protective Fencing					
Protective Fence Length (LF)		7,072	4,215	3,767	***15,054***
Acres of Preservation Area (Ac.)		58	23	22	***103***
Preservation Area Watershed Size (Ac.)		77	62	29	***168***

** Unclassified stream length is provided for streams within preservation areas that were not studied in detail. All others were preliminarily identified using PA Code Chapter 89.5 classification methodologies. Unclassified length is estimated and based upon available PADEP stream mapping and review of aerial photos and topographic mapping*

To meet the stated preservation goals, additional EV watershed preservation would occur in 5 subwatersheds; 3 in House Run (40637, 40638 and a UNT to 40638) and 2 in Hoge Run (40634 and 40633) as illustrated in Table 7-3.

Table 7-3. Proposed EV Stream Preservation Length for Mitigation

Proposed EV Preservation Area Hoge and House Run Tributaries		**Hoge-EV-1**	**Hoge-EV-2**	**House-EV-1**	**House-EV-2**	**HR-3A**	***TOTAL EV PRESERVATION***
Preservation Stream Lengths by Classification (LF)	*Ephemeral*	3,430	3,074	7,285	-	1,062	***14,851***
	Intermittent	892	158	6,412	-	262	***7,724***
	Perennial	2,191	1,706	1,706	-	-	***5,603***
	Unclassified	-	-	-	5,247	-	***5,247***
Total Stream Length (LF)		6,513	4,938	15,403	5,247	1,324	***33,425***
Proposed Total Preservation Acres and Protective Fencing							
Protective Fence Length (LF)		6,525	5,590	13,340	9,153	2,457	***37,065***
Acres of Preservation Area (Ac.)		58	44	136	95	9	***342***
Preservation Area Watershed Size (Ac.)		91	192	171	116	17	***587***

** Unclassified stream length is provided for streams within preservation areas that were not studied in detail. All others were preliminarily identified using PA Code Chapter 89.5 classification methodologies. Unclassified length is estimated and based upon available PADEP stream mapping and review of aerial photos and topographic mapping*

In total, approximately 45,236 LF of combined HQ and EV headwater stream comprised of 20,187 LF of ephemeral, 10,552 LF of intermittent, 5,603 LF of perennial, 8,894 LF of currently unclassified stream and 445 acres of forested watershed area will be preserved in perpetual deed restricted conservation easements as illustrated in Table 7-4.

Table 7-4. Total All EV and HQ Streams Preservation Length for Mitigation

TOTAL ALL PROPOSED PRESERVATION				
Stream Classification	Total Jurisdictional Stream Impacts (LF)	Proposed Preservation Stream Classification	Proposed Preservation Stream Length (LF)	***Preservation Ratio***
Ephemeral	18,456	Ephemeral	20,187	***1.09 : 1***
Intermittent	5,218	Intermittent	10,552	***See preservation ratio below***
		Perennial	5,603	
		Unclassified streams* (per and int)	8,894	
Intermittent	5,218	Int + Per + Unclass	25,049	***4.80 : 1***
TOTAL LF	23,674	all stream classifications	45,236	***1.91 : 1***
Total Preservation Acres and Protective Fencing				
TOTAL AC	na	all preservation areas	445	***na***
TOTAL FENCE	na	all preservation areas	52,119	***na***

** Unclassified stream length is provided for streams within preservation areas that were not studied in detail. All others were preliminarily identified using PA Code Chapter 89.5 classification methodologies.*

Unclassified length is estimated and based upon available PADEP stream mapping and review of aerial photos and topographic mapping

FMLLC believes the proposed preservation will provide sufficient mitigation to offset for 5,218 LF of jurisdictional intermittent stream impact and 18,456 LF of jurisdictional ephemeral stream impact.

7.3.3 Perennial Stream Mitigation

Perennial stream impacts resulting from Project development will be offset by traditional stream restoration methods on mainstem perennial streams within and adjacent to the project area including Garner Run, House Run and tributaries, and McCourtney Run and tributary. These streams all have been historically realigned and straightened to accommodate agriculture and residential development as well as being impacted by recent and current intensive agricultural, residential and other anthropogenic activities and disturbances. In order to offset for 29,901 linear feet of impacts to perennial streams, and the additional 807 LF of stream loss resulting from the relocation of Hoge Run, FMLLC proposes to restore approximately 48,200 LF of existing degraded mainstem perennial streams. In the process, the restoration design will create an additional approximately 400 LF of new stream channel resulting from increased and modified channel sinuosity that will occur with stream reconstruction. The new stream length will be added to the existing stream lengths throughout the project area. As a result, total stream mitigation of approximately 48,600 LF is proposed. The stream restoration/creation areas are comprised of portions of Garner Run mainstem (40643) and UNTs (40643-C, 40651, 40650), McCourtney Run mainstem (40628) and UNT (40630), Hoge Run mainstem (40632) and House Run mainstem (40635)and UNTs (40637, 40639 and 40638) as illustrated on Figure 2, Appendix F.

7.3.4 Hoge Run Stream Relocation

Per consultation with representatives of USACE and PADEP during the pre-application meeting for the Foundation Mine Surface Facilities, the relocation of an extensive portion of Hoge Run (40632) mainstem will serve as 1:1 perennial stream mitigation for impacts to Hoge Run resulting from the Surface Facilities construction as illustrated in Table 7-5. The existing degraded stream channel will be relocated to the north and the relocation will be reconstructed using Natural Stream Channel Design principles. Compensatory mitigation for stream loss of 807 LF of Hoge Run is addressed within the proposed perennial stream restoration and creation.

Table 7-5. Hoge Run Relocation Impacts and Channel Relocation

Hoge Run Relocation		
Hoge Run Existing Stream Length (LF)	Hoge Run* Proposed Channel Relocation (LF)	Hoge Run [1] Stream Loss (LF)
5,731	4,924	807

** includes three box culverts (99 LF, 72 LF and 66 LF) depressed into the stream bed a min. of one foot to preserve natural stream bed*

[1] *mitigation of the loss of 807 LF of Hoge Run is accommodated within the proposed perennial stream restoration*

7.3.5 Perennial Stream Restoration and Creation

To reflect a grand total of stream impacts, the 807 LF of stream loss from the Hoge Run Relocation was added to the perennial stream impact length of 29,901 resulting in jurisdictional stream impacts totaling 30,708 LF. To offset the impacts to perennial streams (totaling 30,708LF) resulting from the Project, FMLLC proposes to provide a multifaceted, watershed-wide stream restoration and riparian buffer enhancement strategy. The strategy will restore entire stream corridors currently impacted by existing and recent agricultural and residential developments and as a result of intensive livestock grazing, crop production, channel modification (historic obstructions and encroachments and realignment) and other anthropogenic alterations and impacts to riparian vegetation. Based on consultation with representatives PADEP-CDMO, PA Fish and Boat Commission, USACE and USEPA and in other recent and similar mining projects (CONSOL Bailey Refuse Area 5 and 6), FMLLC proposes a greater than 1.5 to 1 perennial stream restoration/creation to perennial stream impact ratio as illustrated in Table 7-6.

Table 7-6. Perennial Stream Restoration and Creation Totals

Regulatory Agency	Jursidictional Perennial Stream Impacts (LF)	Hoge Run Relocation Impact (LF)	Hoge Run* Relocation Length (LF)	Hoge Run Stream Loss [1] (LF)	Total Perennial Stream Impacts Requiring Mitigation (LF)	Perennial Stream Restoration Existing Stream Length (LF)	Perennial Stream Restoration Proposed Stream Length (LF)	Additional Created Perennial Stream Length (LF)	Perennial Stream Length Restoration Ratio
PADEP-CDMO	16,294	5,731	4,924	807	17,101	48,200	48,600	400	n.a.
PADEP-SWRO	464	n.a.	n.a.	n.a.	464				n.a.
USACE Pittsburgh District	29,901	5,731	4,924	807	30,708				1.58 to 1

** Per consultation with USACE and PADEP during the pre-application meeting held for the Surface Facilities, it was agreed that the Hoge Run relocation would be credited as 1:1 mitigation* [1] *Both USACE and PADEP determined that the 807 LF of stream loss resulting from the relocation would require compensatory mitigation*

7.3.6 Restoration Benefits

FMLLC proposes to provide compensatory stream mitigation for perennial stream impacts totaling 30,708 which includes 29,901 LF of jurisdictional perennial stream impacts resulting from surface facility construction and the loss of 807 LF of perennial stream from the Hoge Run Relocation. Mitigation for 30,708 LF of perennial stream will include 48,600 LF of stream restoration, a stream restoration length ratio of 1.58:1 when compared to the perennial stream impacts. The proposed perennial stream restoration, creation and enhancements are expected to provide the following water quality benefits and functional lift to the biological and habitat quality of the aquatic ecosystems.

7.3.6.1 Stream Length Increase (LF)

The restoration of the existing degraded streams within the stream restoration areas will increase overall channel sinuosity, flow regime diversity and thus create additional stream length from approximately 48,200 LF (existing stream length) to approximately 48,600 LF. This measure represents approximately 400 LF of additional, HQ designated stream length and provides additional, associated benthic habitat area that currently does not exist.

7.3.6.2 Aquatic Habitat Area Increase (AC)

The restoration of the existing degraded streams within the stream restoration areas and creation of additional stream length will increase the overall channel length and average channel widths throughout each reach as well as the available aquatic habitat area present throughout the stream restoration area from approximately 13.4 AC to 14.9 AC, an increase in aquatic stream habitat area of approximately 1.9 acres and a habitat area increase ratio of 1.11:1.

7.3.6.3 Habitat/Bank Stabilization and Stream Flow Structures

To increase diversity of existing stream flow regimes (riffle, run, pool, glide complexes) and overall habitat diversity in the existing degraded streams within the stream restoration areas, approximately 600 individual aquatic habitat, bank stabilization and flow enhancement structures will be installed within the stream and adjacent riparian area as part of the plan. This will include the creation of oxbow retention areas within abandoned stream channel segments.

7.3.6.4 Existing Riparian Forest Preservation

Existing fragmented, mature and successional forested riparian compartments along the degraded streams within the proposed restoration areas will be preserved within an approximately 100-foot

wide (50 foot from top of both banks) buffer area. The existing riparian forest within the proposed buffer area totals approximately 24.9 AC. The riparian buffers will be protected in perpetuity with protective perimeter fencing and the establishment of perpetual conservation easements (restrictive covenants).

7.3.6.5 Riparian Vegetation Enhancement

Existing, poorly-vegetated riparian areas along degraded streams within the proposed restoration areas will be enhanced with additional tree, shrub and herbaceous plantings and preserved within an approximately 100-foot wide (50 foot from top of both banks) buffer area, post restoration. The total vegetation enhancement area within the proposed riparian buffer and across all restoration areas totals approximately 99.4 AC. The riparian buffers will be protected in perpetuity with perimeter fencing and the establishment of conservation easements (restrictive covenants).

7.3.6.6 Bank Erosion Rate and Sediment Loading Reduction

The stream restoration, riparian habitat and vegetation improvements proposed are anticipated to reduce existing stream bank erosion rates throughout the restoration areas from 1.5 inches per year (moderate-high erosion rates) of erosion to 0.5 inches per year, post-vegetation establishment. The bank erosion rate of 0.5 inches per year is considered low erosion (Rosgen 2001). The reduction in erosion rate represents a 3:1 bank erosion improvement (reduction) ratio. Based on the NRCS Direct Volume Method (bank rescission/erosion) equation, existing moderate to high bank erosion contributes an estimated 1,967 tons of sediments per year to restoration area streams. Proposed stream restoration is expected to reduce moderate-high rates to low rates thereby reducing annual sediment loading to approximately 442 tons per year throughout the restoration area streams. The reduction in erosion rates are expected to remove an estimated 1,525 tons per year of eroded soil materials from mitigation area streams, a sediment loading reduction ratio of 4.44 to 1.

7.3.6.7 Stream Substrate Improvements

As bank erosion, sediment loading and deposition are reduced, the stream restoration and channel reconstruction area substrate composition is expected to improve from silt and fine-grained sand dominated materials to gravel and cobble dominated substrates.

7.3.6.8 Appendix B Sampling - RBP Habitat Scores Improvement

As a result of the proposed stream restoration, habitat improvements and riparian vegetation enhancements, total average Appendix B Sampling - RBP Habitat Scores within the degraded restoration areas are expected to improve from High Marginal / Low Suboptimal range (50 - 60% range) to High Suboptimal/Low Optimal range (70-75%+) across all restoration areas.

7.3.6.9 Appendix B – Biological Score Improvement

As a result of the proposed stream restoration, habitat improvements and riparian vegetation enhancements, total average Appendix B Biological Scores within the degraded restoration areas are expected to improve from an average of 52% to a minimum of 75% across all restoration area streams.

7.3.6.10 Conductivity and Physiochemical

As a result of the proposed stream restoration, habitat improvements, riparian vegetation enhancements and reduction in sediment loading, total average Conductivity levels within the degraded restoration areas are expected to improve from an average of 240 ($\mu S \cdot cm^{-1}$) to sub 200 ($\mu S \cdot cm^{-1}$) levels across all restoration area streams. This represents a minimum 1.20:1 improvement (reduction) in average Conductivity.

7.4 PROJECT AREA WETLANDS, IMPACTS AND PROPOSED REPLACEMENT

A total of forty-five (45) wetland systems, comprising 2.676 acres were identified within the project area. The location of identified project area wetlands is illustrated on Figure 3, Appendix F.

Of the forty-five (45) identified wetlands, twenty-seven (27) wetlands totaling 1.499 acres will be partially or completely impacted as a result of the Project. Twenty-five will be completely impacted while 2 will sustain partial impacts. As a result, the total wetland impacts for the Project area will be 1.305 acres. The anticipated wetland impacts include 1.278 acres of PEM wetland, 0.010 acre of PSS wetland, and 0.016 acres of PFO wetland (Table 6-48).

7.4.1 Wetland Functions

The primary functions of the impacted wetlands were determined to be Flood flow Alteration and Nutrient Removal/Attenuation. Secondary functions were determined to be Groundwater Recharge/Discharge, Production Export, Wildlife Habitat, Sediment/Toxicant Retention and Sediment/Shoreline Stabilization. All of these functions were determined to be limited and/or marginal due primarily to the small size of the resources in comparison to their parent watersheds and the wide spatial distribution of the wetlands throughout the project area.

7.4.2 PADEP/USACE Jurisdiction and Wetland Replacement

Of the 27 wetland systems that will be impacted by the project, 11 were classified as isolated based on the lack of connectivity to (lacking a significant nexus with) other WOUS and did not

fall under USACE jurisdiction. However, all 27 wetlands did fall under PADEP jurisdiction. To ensure that sufficient wetland replacement is provided to offset impacts, the more stringent mitigation requirement (USACE or PADEP) was followed for each wetland impacted. The following section describes the prescribed mitigation ratios based on USACE and PADEP guidelines:

7.4.2.1 Wetland Area Replacement

The Compensatory Mitigation acreage for Wetland Impacts was determined through calculating the required acres of wetland mitigation using standard USACE and PADEP replacement/mitigation ratios for impacts to PEM/POW, PSS and PFO wetland classifications. Based on current guidance, the USACE mitigation ratios (wetland replacement area) for jurisdictional (does not include isolated wetlands) wetland impacts are:

- PEM and POW Impacts - 1:1 mitigation
- PSS Impacts - 2:1 mitigation
- PFO Wetland - 3:1 mitigation

PADEP guidance stipulates that wetland mitigation for wetland impacts (includes all wetland resources) require a minimum mitigation ratio of 1:1. In this case, given the HQ watershed designation throughout the project area, FMLLC proposes the following increased wetland mitigation ratios:

- PEM and POW Impacts - 1:1 mitigation
- PSS Impacts - 1.5:1 mitigation
- PFO Impacts - 2:1 mitigation

Based on the jurisdictional determinations, and because the majority of wetland impact is PEM classification (1:1 mitigation ratio) a minimum of 1.340 acres of wetlands replacement was determined for the 1.305 acres of anticipated wetland impact that will result from the project. This would represent and overall mitigation ratio of 1.03:1

To help ensure proper establishment of the required wetland area, this conceptual wetland mitigation plan provides for increased overall wetland replacement mitigation ratio of 1.08:1 (replacement acreage to impact acreage). FMLLC proposed to create a total of 1.415 acre of replacement wetlands on existing Alpha-owned parcels located within the House Run watershed along the mainstem and a tributary. Replacement wetlands will be comprised of 3 wetland cells totaling 1.300 acres of PEM wetland classification, 0.058 acre of PSS wetland classification and 0.057 acre of PFO wetland classification as illustrated in Table 7-7.

Table7-7. Wetland Replacement Area Requirements and Proposal

FOUNDATION 404 - PROPOSED WETLAND REPLACEMENT					
Wetland Cell	**PEM (AC)**	**PSS (AC)**	**PFO (AC)**	**POW (AC)**	**TOTAL (AC)**
1	0.343	0.039	0.000	0	0.382
2	0.531	0.019	0.038	0	0.588
3	0.427	0.000	0.019	0	0.445
Totals	1.300	0.058	0.057	0	1.415
Required	1.278	0.017	0.045	0	1.340
Difference (surplus)	0.022	0.041	0.012	0	0.075

The surplus wetland area will include additional PEM, PSS and PFO wetland classes. Where possible, pockets of POW wetland area will also be created in the lowest portions of the wetlands to add to the available aquatic habitat and wetland variety. The varied planting zones and elevation ranges within and along the wetland edge will provide a mixture of aquatic influences and habitat types that are anticipated to provide functions and values at least equal to those currently provided by the impacted wetlands.

7.4.2.2 Wetland Functional Replacement

Wetland functional replacement will be provided at a minimum 1:1 ratio based on the functional assessments. The replacement wetlands are designed to provide the opportunity for Floodflow Alteration and Nutrient Removal/ Attenuation as they will be located within the floodway of House Run and its tributary and are designed to accept out of bank flows from the adjacent perennial streams. In addition, based on the low position within the landscape, association and proximity to existing, perennial surface waters, anticipated dense herbaceous, scrub shrub and forest vegetation and depressional topography, the Sediment Toxicant Retention and Sediment/Shoreline Stabilization function will be provided. The wetland cells are also designed to intercept the seasonally high water table present in the associated soils therefore, the Groundwater Discharge function is anticipated to be provided. The lower elevation of the wetland bottom will create the opportunity for surface expression of groundwater and potential contributions to base flows of the adjacent streams. The Production Export and Wildlife Habitat functions will be provided through the establishment of diverse vegetative classes (emergent, scrub shrub and forest wetland) and the proposed plant species composition within the wetland system which were selected because of their hydrophytic indicator status (facultative or wetter) and production of fruits, seeds, and flowers which serve as food sources for a variety of insects, birds and mammals.

7.4.2.3 Wetland Replacement Protection and Preservation

Wetland replacement is expected to occur at the locations indicated on Figure 4, Appendix F within Alpha-owned (PA Land Holdings) parcels. Upon completion, all three wetland mitigation areas (Cell 1, 2 and 3) and the associated stream riparian areas (approximately 100 foot buffers) will be protected in perpetuity through the establishment of permanent Restrictive Covenants (deed restrictions) and/or Conservation Easements in conformance with USACE and PADEP requirements and technical guidance. Furthermore the wetland systems along with the adjacent stream corridors and riparian buffer areas will be enclosed within a protective 3-wire Conservation Area fence which will be installed to prevent future disturbance to the wetland replacement and stream restoration. As a result, the entire riparian area will serve as an interconnected and densely vegetated wildlife corridor that will provide uninterrupted transitional habitat between adjacent, low, rangeland habitats and valley slope forested compartments.

7.5 CONCLUSION

FMLLC has prepared the Conceptual Compensatory Stream and Wetland Mitigation Plan (Appendix F) to offset unavoidable impacts to WOUS, including wetlands and streams that are anticipated to occur with the development of the preferred alternatives for the proposed Foundation Mine Complex (Surface Facilities). The implementation of the compensatory mitigation plan will be concurrent with the proposed impacts and is anticipated to improve the quality and quantity of available stream and wetland aquatic habitats and to provide beneficial, measureable functional lift to the associated project area streams, adjacent subwatersheds and receiving streams. The HQ and EV headwater stream preservation, perennial stream restoration of existing degraded HQ-designated perennial stream, creation of new HQ perennial stream length and enhancement and protection of riparian buffer areas throughout the project area are expected to provide a measurable biological lift to the currently impacted streams. Proposed HQ wetland mitigation is expected to more than offset for the anticipated impacts and is designed to function at a higher level than the existing wetlands. Furthermore, the combined stream restoration, preservation and wetland replacement areas will create, protect and preserve approximately 585 acres of forested HQ and EV stream riparian corridors within permanently fenced Conservation Areas that will be preserved in perpetuity through restrictive covenants (deed restrictions) or conservation easements. FMLLC believes that in total, given the watershed approach and overall scope of the compensatory mitigation proposal, the plan implementation will sufficiently offset the expected impacts to WOUS resulting from the Project.

Section 8.0

CUMMULATIVE IMPACT ASSESSMENT (Block 23)

Alpha Natural Resources (Alpha), with 150 coal mines and 40 preparation plants, and a combined workforce that is 14,000 people strong, is one of the largest coal producers in the United States. It now controls the second largest coal reserve base within major coal basins of the U. S. – that is, within the Central and Northern Appalachia Basins, the Illinois Basin, and the Powder River Basin. Alpha produces and markets both thermal coal to electric utilities and manufacturing industries across the country ,as well as, a higher quality metallurgical coal to steel industries within the U.S. and abroad. Within Greene County Pennsylvania, Alpha affiliates, Cumberland Coal Resources, LP and Emerald Coal Resources, LP, mine the Pittsburgh Coal seam employing a combined workforce of approximately 1,500 people.

The Energy Administration forecasts that coal will remain the dominant fuel used for electricity generation through at least 2035; and the US demand for electricity is expected to grow 30 percent by 2035. Development of the proposed Foundation Mine will help meeting the current and projected future coal/energy production demands.

To facilitate development of the new Foundation Mine, proposed surface facilities will need to be constructed. They will include: a) shaft and slope facilities to provide access to the coal reserves and underground mine operations; b) coal handling, storage, and processing facilities for temporarily storing and cleaning the coal to produce a marketable product; c) Rail Transport facilities consisting of rail spurs and a batch-weigh loading facility for transporting clean coal to the market; d) facilities for disposal of coal refuse at pre-approved site(s); and e) a water supply intake structure, conveyance pipeline, and a fresh water impoundment to supply process water to the mine.

Construction and operation of the proposed Foundation Mine Surface Facilities Complex outlined above and described in detail in Section 2.0 of this document will impact streams and wetlands within the South Fork Tenmile Creek (SFTC) watershed. Descriptions of the proposed impacts are presented in Section 4.0. This section documents the assessment that was made to evaluate cumulative effects resulting from construction and operation of the proposed Foundation Mine Surface Facilities Complex on the SFTC watershed upstream of Mather, Pennsylvania.

8.1 SCOPE OF CUMULATIVE IMPACT ASSESSMENT

The Council on Environmental Quality (CEQ) defines cumulative impact as the "impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions…." 40 CFR 1508.7. The geographic or spatial scope for the cumulative impact assessment (CIA) relating to the proposed Foundation Mine surface facilities construction was determined to be the South Fork Tenmile Creek (SFTC) watershed upstream of Mather, Pennsylvania. The limit of the CIA area was determined based

on FMLLC and their consultant's discussions with USACE during a pre-application meeting on May 13, 2010. This extent of geographic area was chosen because of the abundance and proximity of past actions coupled with proposed and future impacts within the watershed. The South Fork Tenmile Creek watershed upstream of Mather covers approximately 115,739.4 acres (180.72 Sq. Miles) in Greene County, Pennsylvania as shown on Figure 8-1.

According to the USACE 2009 document entitled "General Considerations for Cumulative Impact Assessments (CIA) for Appalachia Coal Mining Activities", "the affected environment for coal mining Section 404 permit application review is limited to the impact on waters of the United States (WOUS) and the riparian corridor". Therefore, this CIA for the proposed Foundation Mine Surface Facilities Complex project evaluates and discusses impacts (positive and negative impact) of proposed coal mining operations on aquatic resources within the South Fork Tenmile Creek Watershed upstream of Mather.

The CIA was initiated by characterizing the environmental setting of the watershed, including, not only current baseline conditions, but also present effects of past actions and anticipated effects of foreseeable future actions. Anticipated effects of Foundation Mine surface facilities construction then were assessed and evaluated to determine how they will modify effects of past actions and foreseeable future actions. The resulting cumulative impact is documented in the following sections and subsections.

8.2 DESCRIPTION AND EXISTING CONDITIONS OF THE CIA AREA WATERSHED

The CIA area (South Fork Tenmile Creek Watershed upstream of Mather) for the proposed Foundation Mine Surface Facilities Complex covers approximately 115,739 acres (180.7 Sq. Miles) as shown on Figure 8-1 and is comprised of six sub-watersheds, *viz.*, Hargus Creek & McCourtney Run (21.6 Sq. Miles), Upper South Fork Tenmile Creek (34.6 Sq. Miles), Browns Creek (46.1 Sq. Miles), Ruff Creek (26.8 Sq. Miles), Lower South Fork Tenmile Creek (38.5 Sq. Miles), and Pursley Creek (13.1 Sq. Miles). These sub-watersheds are all tributaries to South Fork Tenmile Creek and are located upstream of Mather, Pennsylvania. This CIA area watershed covers portions of the USGS Garards Fort, Holbrook, Mather, Newport, Oak Forest, Rogersville, Waynesburg, and Wind Ridge 7.5-minute topographic quadrangle maps as shown on Figure 8-2. Past and/or Present mining activities exist in all of the CIA area sub-watersheds except in the Hargus Creek & McCourtney Run sub-watershed where the Foundation Mine Surface Facilities Complex is proposed.

8.2.1 <u>Physiographic and Environmental Setting</u>

The Cumulative Impact Assessment (CIA) area which includes Foundation Mine Surface Facilities Complex is located in the Pittsburgh Low Plateau Section of the Appalachian Plateau Physiographic Province in Greene County, Pennsylvania. The topography consists of gently rolling hills separated by relatively narrow, steeped walled, valleys of moderate relief of approximately 300 feet. Most of the land in the area is undeveloped, although local farms and

residential development occupy the upland and valley areas. Interstate, state, and local roadways have been developed throughout the area. Utilities and pipelines also have been developed in some areas. Generally, the slopes are steep and wooded while the rounded flat ridge uplands are covered by fields and pastures areas. The upland area is underlain by bedrock belonging to the Greene Formation and is predominantly shale, sandstone, siltstone, thin limestone, claystone, carbonaceous shale, and coal. Valley base levels generally have been developed in homogeneous bedrock dominated by shale, sandstone, siltstone, and limestone of the Washington and Waynesburg Formations. Most of the rock strata are gently folded with amplitudes of less than 5 degrees. The extent of the proposed Foundation Mine Surface Facilities Complex, as shown on Figure 8-1, covers approximately 1867 acres, which represents 1.6% of the CIA area watershed.

Brief descriptions of the six sub-watersheds that constitute the CIA area Watershed are presented below.

8.2.1.1 Upper South Fork Tenmile Creek

The Upper South Fork Tenmile Creek sub-watershed is located mainly in Gray and Center Townships with small portions in Richhill Township and Jackson Township. Upper South Fork Tenmile Creek has a Pennsylvania Code Chapter 93 designation of High Quality Stream. The majority of the area is forested (68.4%). Agricultural areas also comprise a large portion (23.5%) of this sub-watershed. Other than a few small communities (Graysville and Rogersville), little development has occurred within the area. Graysville Elementary School sewage treatment plant, Rogersville sewage treatment plant, Pioneer Office waste water treatment plant, and Moores Laundromat in Graysville all have discharge points within the watershed. CNX Gas Company and Target Drilling also have discharge points. Refer to Figure 8-3.

Underlying the northwest portion of this sub-watershed is CONSOL Energy's Bailey Mine. The area also abuts Bailey Mine surface facilities. Underlying a very small southwest section of the watershed is the proposed Foundation Mine. The southeast end of the watershed is located above the EmeraldNo.1 Mine and includes Emerald No.1 Mine surface facilities including two shafts and a small portion of the Emerald Mine preparation plant and batch weigh load-out facility.

8.2.1.2 Browns Creek

Browns Creek is a major tributary to South Fork Tenmile Creek and is the largest sub-watershed within the CIA area. The majority of the watershed is located in Morris and Washington Townships, with lesser portions in Center and Franklin Townships. Pennsylvania Code Chapter 93 designation for this stream is High Quality. Land use within the area is similar to the Upper South Fork Tenmile Creek sub-watershed with the majority of the area comprised of forested (74.2%) and agricultural lands (18.9%). Also, similar to the Upper South Fork area, there are two abandoned municipal landfills and gas facilities in this area. Refer to Figure 8-3. A couple

of industrial facilities and a railroad are also located along the creek. The confluence of Browns Creek and South Fork Tenmile Creek is located just upstream of the Borough of Waynesburg.

The extreme northwest section of this sub-watershed is located above CONSOL Energy's Enlow Fork Mine. The Browns Creek sub-watershed also is the location of the proposed Bailey Mine Expansion which includes both underground mine workings and surface facilities. Underlying the eastern edge of the area is the abandoned Gateway Mine (closed 1993).

8.2.1.3 Ruff Creek

Ruff Creek discharges into South Fork Tenmile Creek at a location downstream of Waynesburg. The sub-watershed is located in the Townships of Morgan, Franklin, and Washington. Although the majority of the land use in the area consists of forest (64.6%), the Ruff Creek sub-watershed area has slightly less forested area than the two areas discussed previously. Also, more agricultural area (25.1%) and developed area (9.6%) exist compared with the Upper South Fork Tenmile Creek and Browns Creek sub-watersheds. Water and sewage treatment plants, a country club and a reported academy have discharge points in this sub-watershed as indicated on Figure 8-3. Also crossing through the area is Interstate Route 79, which contributes to development of the area. Ruff Creek's Pennsylvania Code Chapter 93 designation is Warm Water Fishery.

The closed Gateway Mine is located below most of the Ruff Creek sub-watershed area. Small portions of several abandoned mines including, the Clyde Mine, the Marianna Mine, and the Mather Mine, also are located below the area.

8.2.1.4 Lower South Fork Tenmile Creek

At the southern extent of the CIA area is the Lower South Fork Tenmile Creek sub-watershed. All of the other sub-watersheds are contributory to South Fork Tenmile Creek located in this area. This is by far, the most developed area within the CIA area watershed. This sub-watershed is located within Franklin, Whitely, Jefferson, Morgan and Washington Townships and also includes Waynesburg Borough. The forested area within this sub-watershed is 62.0%; agricultural area is 17.3%; and the developed area is 16.2%. In addition to many residences, a college, schools, an airport, and other community-related facilities (including sewage treatment facilities) exist within this area. Waynesburg area also includes numerous industrial facilities with multiple surface and groundwater withdrawals and discharges.

Several abandoned and closed mines exist below the Lower South Fork Tenmile creek sub-watershed area, including the Gateway Mine, Mather Mine, and Dilworth Mine. Multiple reclaimed surface mine areas also are located within the sub-watershed boundary. The Emerald No.1 Mine is located below the west and south portions of the area. Also within the area are Emerald Mine Surface Facilities including the Preparation Plant and Batch Weigh Loadout, multiple shaft sites, Emerald Refuse Disposal Areas #1 and #2, and the proposed future Emerald

Refuse Disposal Area #3. Discharge points associated with the Emerald No. 1 Mine area shown on Figure 8-3.

8.2.1.5 Pursley Creek

The Pursley Creek sub-watershed is located to the east of the Hargus Creek & McCourtney Run sub-watershed. This sub-watershed is located in the Townships of Center, Franklin, and Wayne, and also has a Pennsylvania Code Chapter 93 designation of High Quality. Land use in the area consists of 73.8% forested and 19.3% agricultural. Mine surface facilities are the only source of development for the area as indicated on Figure 8-3.

The Cumberland Mine is located under the southern portion of the sub-watershed, along with a supporting shaft site on the surface. The Emerald #1 Mine is located under the majority of the remainder of this sub-watershed. Several supporting shaft site areas for the Emerald #1 Mine are also located in the area.

8.2.1.6 Hargus Creek & McCourtney Run

The CIA area includes the entire Hargus Creek sub-watershed, including the McCourtney Run watershed area. This sub-watershed is located within Jackson and Center Townships and includes approximately 22 miles of the McCourtney Run main stem and its tributaries, including Hoge Run, House Run, and Grinnage Run. It also includes Hargus Creek and its other tributaries. McCourtney Run flows northeast from its headwaters to its confluence with Hargus Creek which discharges into South Fork Tenmile Creek upstream of Rogersville. The entire Hargus Creek watershed has a Pennsylvania Code Chapter 93 designation of High Quality. The topography and land use within this sub-watershed are similar to the others in the CIA area. The majority of the land use is forested (78.8%), with agricultural being 14.6% and developed areas around 5.9%. Also included in the sub-watershed is a portion of Pennsylvania State Game Land Number 179. A railroad runs along McCourtney Run and a gas facility is located within the area. As noted on Figure 8-3, the West Greene Jr./Sr. High School also has a sewage treatment plant discharge within the sub-watershed.

The Hargus Creek and McCourtney Run sub-watershed is the location of the proposed Foundation Mine underground workings and Surface Facilities Complex.

8.2.2 Land Use Within the CIA Watershed Area

Existing land uses for the South Fork Tenmile Creek watershed upstream of Mather, PA (CIA area) were determined using 2001 National Land Cover Data (NLCD 2001) and a Geographical Information System (GIS). These data sources categorize land cover within the CIA watershed into the fifteen (15) numbered categories listed below. For this CIA, the 15 categories were combined as noted below to develop a broader representation of land uses within the watershed.

LAND USE CATEGORIES

OPEN WATER,
1. Open Water

DEVELOPED
2. Developed-Open Space
3. Developed-Low Intensity
4. Developed-Medium Intensity
5. Developed-High Intensity

BARREN LAND
6. Barren Land

FOREST
7. Deciduous Forest
8. Evergreen Forest
9. Mixed Forest

SCRUB/SHRUB
10. Scrub/Shrub

GRASSLAND/HERBACEOUS
11. Grassland/Herbaceous

AGRICULTURAL
12. Pasture/Hay
13. Cultivated Crops

WETLANDS
14. Woody Wetlands
15. Emergent Herbaceous Wetland

The eight general/summary categories (Open Water, Developed, Barren Land, Forest, Scrub/Shrub, Grassland/Herbaceous, Agricultural, and Wetlands) were used for the assessment. Land area within existing coal mining permit boundaries were incorporated into the land use calculations as an additional land use category. Table 8-1 summarizes the land uses that were identified within each sub-watershed of the CIA area.

As shown on Table 8-1, forested land accounts for 69.6% (80,610 acres) of the total watershed area, thus it is the dominate land use within the watershed. Agricultural land (i.e. pasture/hay and cultivated crops) accounts for 19.87% (23,007 acres) of the area. 8.89% (10,289 acres) is developed; however, area encompassed by existing mining operations is not included in this acreage as indicated on Table 8-1. Also, 85% of the developed land is categorized as developed-open-space.

Table 8-1. Land Use Within Sub-Watersheds of the CIA Watershed

	LAND USE (acres)										
SUB-WATERSHED	**Open Water**	**Developed [1]**	**Forest [2]**	**Shrub/Scrub**	**Grassland / Herbaceous**	**Agricultural [3]**	**Wetlands [4]**	**Existing Mining Operations**	**Total (acres)**	**Total (miles²)**	**Proposed Mining Operations**
Browns Creek	23.5	1,837.5	21,915.5	2.1	145.7	5,583.1	7.7	11.1	29,526.0	46.1	115.1
Lower South Fork Tenmile Creek	32.6	3,989.0	15,271.7	7.2	279.4	4,267.2	101.4	687.3	24,635.9	38.5	222.5
Hargus Creek & McCourtney Run	3.0	822.0	10,969.7	0.0	88.1	2,028.0	2.2	0.0	13,913.0	21.7	1,849.9
Pursley Creek	0.0	458.1	6,215.8	0.0	36.5	1,620.2	0.6	84.4	8,415.7	13.1	15.5
Ruff Creek	14.8	1,645.2	11,086.5	4.4	97.7	4,301.6	0.0	0.0	17,150.1	26.8	0.0
Upper South Fork Tenmile Creek	10.1	1,537.4	15,151.3	1.2	121.5	5,207.0	25.0	105.6	22,159.1	34.6	17.1
Total	84.0	10,289.2	80,610.4	14.9	768.9	23,007.2	136.9	888.4	115,799.8	180.9	2,220.1
% of CIA	0.07%	8.89%	69.61%	0.01%	0.66%	19.87%	0.12%	0.77%	-	-	1.92%

[1] Includes "Developed Open Space", " Developed Low Intensity", "Developed Medium Intensity", " and "Developed High Intensity" as determined using the 2001 National Land Cover

[2] Includes "Deciduous Forest", " Evergreen Forest", and "Mixed Forest" as determined using the 2001 National Land Cover Data (NLCD 2001).

[3] Includes "Pasture / Hay" and " Cultivated Crops" as determined using the 2001 National Land Cover Data (NLCD 2001).

[4] Includes "Woody Wetlands" and " Emergent Herbaceous Wetlands" as determined using the 2001 National Land Cover Data (NLCD 2001).

Areas presented under the "Proposed Mining Operations" represent area encompassed by proposed surface mining permit boundaries for the Foundation Mine Surface Facilities Complex, Emerald Coal Refuse Disposal Area #3, and CONSOL Energy's proposed surface facility for the Bailey Mine. All land within these permit boundaries was considered proposed mining activities. Proposed Mining encompasses 2,220.0 acres (1,867 acres at the Foundation Mine Surface Facilities Complex, 238.0 acres at the Emerald Coal Refuse Disposal Area #3, and 115.1 acres for the Bailey Mine proposed surface facility) or 1.92% of the CIA watershed area.

Historical aerial imagery for the CIA area was obtained from Penn State Center for Environmental Informatics' Penn Pilot website. The imagery was flown during 1967 to 1972 when the vegetation condition was "leaf on". The photos produced were at a scale of 1:40,000. These images were imported into AutoCAD and the boundaries of wooded area were digitized to determine the magnitude of forest area. Due to the quality of the images, the land use could not be further categorized as indicated in Table 8-1, but the results still offer a comparison of the disturbances that have occurred historically within the CIA watershed. Extensive agricultural and timbering activities were taking place during the time the imagery was flown (1967-1972). Only 41.9% of the watershed area was forested at that time compared to 69.6% at the present time. The remaining 58.1% had been disturbed by human activities including: agriculture, timbering, and development. This shows a 66.1% increase in forested land cover area during the last 40 years.

In summary, the dominant land uses within the CIA watershed include forest, and agricultural, which account for over 89% of the land area. The proposed and existing mining operation land uses will eventually occupy approximately 2.69% of the CIA watershed.

8.2.3 Land Use Within the 100-Foot Riparian Corridor

Land uses within a 100-foot wide riparian corridor established around streams within the CIA area were identified and categorized for each of the individual sub-watershed as shown on Table 8-2. Stream centerlines obtained from the PADEP stream network were offset 50 feet on either side to establish the riparian corridors. Existing land uses within the riparian areas then were evaluated. Riparian corridors for larger streams that are not represented on USGS mapping by a single line were delineated (using USGS mapping) by offsetting 50 feet from both stream banks.

As shown on Table 8-2, the total area within the riparian corridor is 12,447.1 acres. The majority of the CIA riparian corridor, 57.8% (7,199.0 acres) is forested and 22.2% (2,769.7 acres) is agricultural. Approximately 2,148.9 acres or 17.3% of the CIA riparian area has been impacted by development and 65.8 acres or 0.5% lies within existing coal mining permit boundaries. The amount of riparian corridor expected to fall within proposed coal mining permit boundaries is 180.1 acres (Foundation Mine Surface Facilities Complex is 144.5 acres, and Emerald Refuse Disposal Area #3 is 35.5 acres) or approximately 1.4% of the riparian corridor within the CIA watershed. The total riparian corridor area is approximately 10.75 percent of the CIA area watershed.

Table 8-2. Land Use Within the 100-Foot Riparian Corridor of Sreams Within the CIA Watershed

	LAND USE (acres)										
Sub-Watershed	**Open Water**	**Developed [1]**	**Forest [2]**	**Shrub / Scrub**	**Grassland / Herbaceous**	**Agricultural [3]**	**Wetlands [4]**	**Existing Mining Operations**	**Total (acres)**	**Total (miles²)**	**Proposed Mining Operations**
Browns Creek	11.1	386.8	2,113.8	0.7	22.9	621.2	3.2	1.3	3,161.0	4.94	0.0
Lower South Fork Tenmile Creek	29.0	602.0	1,467.3	0.8	23.7	474.1	94.3	57.7	2,748.9	4.30	35.5
Hargus Creek & McCourtney Run	3.2	342.0	780.3	0.0	14.4	289.3	1.9	0.0	1,431.2	2.24	144.5
Pursley Creek	0.0	117.7	505.3	0.0	4.0	186.5	0.0	0.9	814.5	1.27	0.0
Ruff Creek	11.6	322.4	1,037.8	0.0	10.3	582.3	0.0	0.0	1,964.4	3.07	0.0
Upper South Fork Tenmile Creek	3.5	378.0	1,294.5	0.0	16.4	616.2	12.7	5.9	2,327.1	3.64	0.10
Total	58.4	2,148.9	7,199.0	1.5	91.7	2,769.7	112.1	65.8	12,447.1	19.45	180.1
% of Riparian Buffer Zone	0.47%	17.26%	57.84%	0.01%	0.74%	22.25%	0.90%	0.53%	-	-	-
% of CIA	0.05%	1.86%	6.22%	0.00%	0.08%	2.39%	0.10%	0.06%	-	-	-

[1] Includes "Developed Open Space", " Developed Low Intensity", "Developed Medium Intensity", " and "Developed High Intensity" as determined using the 2001 National

[2] Includes "Deciduous Forest", " Evergreen Forest", and "Mixed Forest" as determined using the 2001 National Land Cover Data (NLCD 2001).

[3] Includes "Pasture / Hay" and " Cultivated Crops" as determined using the 2001 National Land Cover Data (NLCD 2001).

[4] Includes "Woody Wetlands" and " Emergent Herbaceous Wetlands" as determined using the 2001 National Land Cover Data (NLCD 2001).

Dominant land uses within the 100-foot wide riparian corridor area within the CIA also are forest and agricultural which account for about 80.0% of the riparian area. Proposed mining operations would occupy less than 1.5% of the existing riparian corridor area.

8.2.4 Stream & Wetland Condition Assessment

Stream lengths within the CIA area were established using data from the PADEP Stream Network. The PADEP stream lengths were increased by a factor (i.e., ratio) established from a comparison of field delineated stream lengths with PADEP data for a portion of the watershed.

Comprehensive field studies involving stream delineation/classification were not performed for the entire CIA watershed; only for the section of the Hargus Creek sub-watershed (including McCourtney Run) surrounding the Foundation Mine Surface Facilities project boundary. A comprehensive stream assessment was performed for the Foundation Mine Project Area by Wallace & Pancher, Inc. (WPI). This comprehensive assessment included extensive physical, chemical, and biological stream assessments and determination of the length of jurisdictional stream within the sub-watershed according to Chapter 89 stream assessment criteria.

Stream data for sub-watersheds of the CIA area were obtained from PADEP Stream Network geospatial data published in 1998. The PADEP identified stream data contain segments that identify main stems and major tributaries. The WPI-delineated stream data for portions of the Hargus & McCourtney Run watershed provide jurisdictional stream lengths determined and confirmed through joint field study (by ACOE, PADEP, and WPI) and GPS surveys. The field delineated stream lengths (jurisdictional stream lengths) were compared with the corresponding PADEP identified stream lengths for the same area to develop ratios between actual delineated stream lengths and "PADEP Stream Network" identified stream lengths. Since all six (6) sub-watersheds of the CIA area are within the same physiographic province and have similar geomorphology, it is assumed that similar ratios of delineated stream lengths to "PADEP Stream Network" identified stream lengths will apply to all sub-watersheds of the CIA area. Table 8-3 presents both the field delineated and "PADEP Stream Network" stream lengths established for the CIA area as well as the ratios, or "factors", resulting from the data comparison. These ratios were applied to the "PADEP Stream Network" identified stream lengths to develop an approximation of the jurisdictional stream lengths by classification within each sub-watershed and hence the total CIA watershed. Results of this analysis are provided in Table 8-3. "PADEP Stream Network" stream lengths within field delineated area of the Hargus & McCourtney Run sub-watershed represent approximately 42.74% of the total jurisdictional stream length determined by field delineation.

The total "estimated jurisdictional" stream length for the CIA area is approximately 5,421,039 linear feet compared to 52,710 linear feet of jurisdictional stream length anticipated to be impacted by the proposed project. This expected stream impact length represents less than 1% of the total stream within the CIA watershed while the proposed mitigation stream length of about 91,036 linear feet represents restoration and or creation of approximately 1.7% of the total stream length within the CIA watersheds; a beneficial increase in new and/or restored benthic stream habitat of 0.7%.

Table 8-3. Estimated Sub-Watershed Stream Length Determination [1]

Sub-Watershed	Stream Classification	Stream Lengths based on Field Delineation (ft)	PADEP Stream Length within Field Delineated Streams (ft)	Expressed as % of PA DEP Stream Length	PADEP Stream Length within Sub-Watershed (ft)	Estimated Stream Lengths (ft)	Sub-Watershed Totals (ft)	
Hargus Creek & McCourtney Run	Perennial	85,638	62,327	137.4%	266,423	366,065	**623,430**	
	Intermittent	15,316		24.6%		65,540		
	Ephemeral	44,863		72.0%		191,825		
Upper South Fork Tenmile Creek	Perennial	-	-	137.4%	433,202	595,219	**1,013,491**	
	Intermittent	-		24.6%		106,453		
	Ephemeral	-		72.0%		311,819		
Browns Creek	Perennial	-	-	137.4%	588,434	808,515	**1,376,670**	
	Intermittent	-		24.6%		144,600		
	Ephemeral	-		72.0%		423,555		
Ruff Creek	Perennial	-	-	137.4%	365,688	502,459	**855,545**	
	Intermittent	-		24.6%		89,863		
	Ephemeral	-		72.0%		263,222		
Pursley Creek	Perennial	-	-	137.4%	151,614	208,319	**354,708**	
	Intermittent	-		24.6%		37,257		
	Ephemeral	-		72.0%		109,132		
Lower South Fork Tenmile Creek	Perennial	-	-	137.4%	511,721	703,110	**1,197,196**	
	Intermittent	-		24.6%		125,748		
	Ephemeral	-		72.0%		368,337		
Totals		**145,817**	**62,327**		**2,317,082**		**5,421,039**	**ft [2]**
		27.6			**438.8**		**1,026.7**	**miles**

[1] Chapter 89 stream delineation/classification data developed by WPI are available for portions of the Hargus & McCourtney Run sub-watershed surrounding the Foundation Surface Facilities Project Boundary. Field delineated stream lengths were compared to the PADEP Stream Network geospatial data published in 1998 as shown in Table 8-3 to provide a ratio between actual delineated stream lengths and the PADEP Stream Network. These ratios were applied to the published data to develop an approximation of the actual stream lengths within in each sub-watershed and ultimately the CIA watershed. It was determined that the stream lengths within the area of field delineated stream based on PADEP Stream Network represents 23.39% of the streams within the Hargus & McCourtney Run sub-watershed (2.69% of the streams within the CIA watershed).

[2] The following is a breakdown (in feet) of the 5,421,039 ft total estimated CIA Watershed stream length by classification.

Perennial = 3,183,688.1
Intermittent = 569,461.1
Ephemeral = 1,667,890.2

8.2.4.1 Stream Conditions Assessment

WPI, on behalf of Foundation Mining, LLC, conducted a field assessment of existing stream conditions (including multiple stream habitat evaluations) during several periods of investigation extending from late 2006 through June, 2011 for the proposed project area. The streams assessed included the main stems of Hoge Run, House Run, Garner Run, Grinage Run, McCourtney Run and their respective tributaries. Stream reaches were evaluated based on readily observable physical deficiencies including evidence of channel alteration, bank stability, vegetative protection, and riparian zone width. As indicated previously, stream reaches of other watersheds within the CIA area were not field assessed for existing conditions or stream habitat. Never the less, stream conditions within the section of the CIA area not subjected to field assessments are expected to be similar to stream conditions within the CIA area that was field evaluated due to the similarity of land use within the CIA area and the riparian zone of each stream reach. Stream conditions and habitat within the project area are discussed in Section 6.0.

Summarized in Table 8-4 is the stream classification assigned to each watershed by PADEP along with the use attainment status. This information was obtained from PADEP's eMap web site (e.g., Integrated 303d Listing).

Table 8-4. Watershed Use Attainment Status

Sub-watershed	Stream Classification	Use Attainment Status
Upper South Fork Tenmile Creek	HQ - WWF	Use Attaining.
Hargus Creek & McCourtney Run	HQ - WWF	Use Attaining.
Pursley Creek	HQ - WWF	Use Attaining.
Browns Creek	HQ - WWF	Use Attaining except for a 0.57 mile section of Bates Run.
Ruff Creek	WWF	Use Attaining except for a 0.74 mile section of Craynes Run.
Lower South Fork Tenmile Creek (LSFTC)	WWF	Use Attaining except for a 0.86 mile section of Smith Creek and two of its tributaries (0.71 and 0.82 mile) and 3.9 miles of LSFTC.

Note: WWF = Warm Water Fishery; HQ = High Quality

All streams within the Upper South Fork Tenmile Creek, Hargus Creek & McCourtney Run, and Pursley Creek sub-watersheds are currently classified as use attaining and are meeting PADEP's chemical and biological standards for HQ-Warm Water Fishery streams. As noted in Table 8-4, the Browns Creek, Ruff Creek, and Lower South Fork Tenmile Creek watersheds each include stream section(s) not attaining PADEP's designated use standards due to partial impairment of aquatic life. The non-attainment status assigned to the relatively short stream segments within the Browns Run and Ruff Creek watersheds reportedly are due to siltation resulting from agriculture. Within the Lower South Fork Tenmile Creek watershed, non-attainment statuses for Smith Creek and its tributaries reportedly are a result of Abandoned Mine Drainage – Metals, Land Disposal – Metals, and Subsurface Mining – Metals. The short segment of the Lower South Fork Tenmile Creek classified as "use not attained" due to partial impairment of aquatic life, the source and cause of which are unknown.

8.2.4.2 Wetland Conditions Assessment

To assess the presence and extent of wetlands within the CIA Area, United States Fish and Wild life Service's (USFWS) National Wetland Inventory (NWI) data digital map was studied and the most current NWI data pertaining to the CIA area was downloaded and analyzed. The NWI map indicates that, excluding Riverine wetlands, 244 wetlands covering approximately 201 acres exist within the CIA area. Including Riverine wetlands, the total wetland area increases to approximately 1657 acres. The majority of the wetlands identified by NWI (183 of the 244 non-Riverine wetlands reported) were classified as freshwater ponds. Some freshwater ponds may have been constructed as potential water sources for agricultural reasons and some may have been constructed as sedimentation or stormwater basins for past mining and other industrial/commercial operations. Of the remaining wetlands, 41 were classified as freshwater emergent wetlands, 18 were classified as freshwater forested/shrub wetlands, one was classified as other, and one classified as lake.

WPI, on behalf of FM LLC, conducted field investigation and delineation surveys of wetlands within the proposed Foundation Mine Surface Facilities Complex project area during several periods of investigation extending from late 2006 through June of 2011. WPI has, as a result of the field investigations and jurisdictional determination field views, identified a total of forty-five (45) wetland systems comprising approximately 2.68 acres within the proposed Foundation Mine Section 404 Permit Area. Within the same Project Area the U.S. Fish and Wildlife Service's NWI map has identified four (4) NWI wetland systems that represented a total of approximately 1.20 acre of wetland. All field identified wetlands by WPI were digitally created from GPS point data using GIS mapping software and then transferred to GIS mapping software for further use. Detailed information of WPI wetland surveys is provided in Section 6.0 of this Section 404 permit application.

8.2.5 <u>Relationship Between Land Use and Stream and Wetland Conditions</u>

During field surveys conducted by WPI, a strong correlation was observed between overall stream condition and land use in and around the riparian zone; i.e., land uses which impacted the

health, width, and vegetative composition of the riparian buffer. Streams located within forested settings generally exhibited stable stream channel characteristics (stable stream banks, intact fluvial bed forms and associated habitat characteristics). However, streams located adjacent to or within agricultural land uses typically were prone to deficiencies such as lack of woody vegetation and stream bank instability as well as potential negative effects on stream water quality due to active livestock pasturing/grazing and tilling along and within floodplain and riparian zones. Active pasturing and tilling in riparian areas reduces or eliminates vegetation, introduces pathogens and surplus nutrients into streams from animal wastes and fertilizers, loosens and weakens stream banks which leads to their failure and erosion and causing increases in sediment deposition, turbidity and temperature.

As indicated by Tables 8-1 and 8-2, the 100-foot riparian corridor within the CIA area occupies approximately 11 % of the CIA area. Approximately 58% of that area is forested, along with approximately 70% of the total CIA area, which helps to maintain the integrity of the streams within the CIA watershed. Approximately 22% of the CIA riparian area is agricultural lands and approximately 17% is developed land. According to the Greene County Comprehensive Plan adopted August 14, 2008, farms and other agricultural developments are on the rise (up to 2% over the past 10 years) and the average farm size has increased to around 161 acres. Therefore, should agricultural activities continue to increase within the CIA watershed as has been seen in other parts of Greene County, it is likely that more of the riparian zones within the agricultural lands will be impacted with consequential negative impacts to stream water quality and stream bank stability resulting in erosion and sedimentation. It is apparent that the greatest improvement to the CIA watershed would be achieved if stream and wetland mitigation/restoration efforts are focused towards the agricultural related disturbances, particularly where intensive livestock interaction along and within the streams and riparian corridors has occurred.

8.3 MINING RELATED IMPACTS ON WATERS OF THE UNITED STATES

Mining-related impacts on Waters of the United States (WOUS) from past, present, and reasonably foreseeable future projects within the CIA area are discussed in the following sections. The discussions included the type and quantity of affected resources, the methods that were used to identify and quantify impacts, and the time periods during which the activities occurred or are anticipated to occur.

8.3.1 Impacts from the Proposed Action

The proposed Foundation Mine Surface Facilities will encompass approximately 1867 acres within the 115,739-acre CIA watershed area. As discussed in Section 6.2 of this document, 1471 acres of the 1867 acres, i.e.78.8% of the project area is forested, much of which will be disturbed by construction of the proposed project. Forested area within the project site, as well as much of the residential and agricultural/field area, will be replaced with the mine surface facilities and adjacent grassy areas.

Construction of the surface facilities will require considerable earthwork involving encroachment within area streams and wetlands. Aquatic impacts have been minimized by the proposed site design, but cannot be avoided. They will include: 1) loss of streams and wetlands and associated habitat as a result of facilities construction; 2) potential for water quality degradation, and 3) changes to the riparian corridor of other streams within the project area including land use changes.

Facility operation will involve coal storage in open stockpiles, mine water handling, and coal refuse disposal – all of which, if not properly designed and operated as proposed by Foundation Mining, LLC, would have potential to affect water quality. The Foundation Mine Surface Facilities design incorporates "Best Management Practices" for achieving compliance with anti-degradation requirements established by PADEP. Facility operations will comply with requirements of the Clean Water Act and with discharge requirements established by the State to control water quality degradation.

8.3.1.1 Stream and Wetland Impacts

The proposed Foundation Mine Surface Facilities complex construction will impact jurisdictional streams and wetlands. The construction activities will encroach into jurisdictional streams and wetlands. Table 4-1 of Section 4.0 identifies and quantifies each encroachment. Detailed descriptions are included in Sections 4.0 and 6.0 of this document.

Approximately 54,382 linear feet of jurisdictional stream will be impacted by proposed activities and will require mitigation. This total includes 807 linear feet of the 5,731 linear feet of perennial stream channel that will be lost when Hoge Run is relocated to a 4,924-foot long channel. The remaining 53,575 linear feet of proposed stream encroachment consists of 29,901 linear feet, 5,218 linear feet, and 18,456 linear feet of perennial, intermittent, and ephemeral stream, respectively. Refer to Table 4-1 for further breakdown of total stream impacts (57,895 LF of total impact as opposed to the 54,382 LF of jurisdictional stream impact to be mitigated). Baseline CIA watershed conditions summarized in Section 8.2.4 indicate the CIA area may contain as many as 1,027 miles of stream channel. Comparing these two totals, i.e., proposed stream encroachment length with the watershed stream length estimate, indicates the Foundation Mine surface facilities will impact approximately 1% of total stream length within the CIA watershed.

In addition to stream impacts, 27 wetlands totaling 1.305 acres also will be impacted by construction of the Foundation Mine Surface Facilities Complex. Included in the impacted wetland acreage is 1.278 acres of Palustrine Emergent (PEM) wetland, 0.010 acre of Palustrine Scrub Shrub (PSS) wetland , and 0.016 acre of Palustrine Forested (PFO) wetland.

Throughout the site selection and design process every effort was made to ensure that selection and placement of all proposed mining related facilities or activities locations would not only support the purpose and need for the project but also would protect the aquatic and other natural resources to the extent possible. Useful efforts made in this regard included development and analysis of alternative facility locations and orientations, and site specific design alternatives to

avoid/minimize aquatic impacts. These efforts also were balanced with consideration for cost and logistical concerns and the safety of future employees and local residents that will work and reside in the adjacent communities. Avoidance and minimization efforts are discussed in detail in Section 4.0 Measures Taken to Minimize Aquatic Impacts, and in Section 5.0 Alternative Analysis.

Aquatic impacts (loss of streams and wetlands) will result primarily from earthwork activities necessary for site development and from disposal of coal refuse generated by coal cleaning operations. Specific activities proposed within the project area wetlands and stream channels fall into one of the following four categories: 1) excavation/removal also referred to as cut, 2) cut – permanent, 3) culvert construction within the stream channel, 4) filled with coal refuse, soil or other earthen material from site grading operations, 5) filled – permanent, and 6) filled with impounded water. Not included is the Hoge Run relocation which represents approximately 5,731 linear feet of perennial stream impact. Presented in Table 8-5 is a breakdown of proposed encroachments based on these categories.

The encroachments will result in loss of the identified stream channels and wetlands while the mine is operational. However, when mining operations are completed, stream channels represented by categories 1, 3, 4, and 6, approximately 26,749 linear feet, will be restored as part of site reclamation/restoration. Construction plans provide for stream channels within proposed fill areas to be filled with a geotextile wrapped aggregate layer before being covered with fill. During reclamation, when the site is restored, the top geotextile will be removed exposing the aggregate and underlying substrate. The 31,146 linear feet of stream channel classifying as Category 2 or 4 will never be restored.

8.3.1.2 Potential Water Quality Impacts

As discussed in Section 6.6, the proposed project site is located within an HQ-WWF watershed. Surface water quality within the project site has been established by analytical testing of water samples from all the major streams within the project area and through biological monitoring. As shown in Table 6-49, the average water quality data of all the five (5) major streams (House Run, unknown tributary to House Run, Garner Run, Hoge Run, and McCourtney Run) comply with the limitations of Water Quality Standards presented in Chapter 93 of the Pennsylvania Code. Although the maximum specific conductance of water samples from Garner Run and McCourtney Run are relatively high at 461 micro-mhos/cm and 407 micro-mhos/cm, respectively, compared to that in the other three streams, the values are within permissible limits.

Construction and operation of the Foundation Mine Surface Facilities Complex is not expected to impact area water quality because the facility design includes “Best Management Practices” for achieving compliance with anti-degradation requirements established by PADEP.

Facilities used to store coal, coal refuse, or coal/refuse contact water will be provided with a synthetic liner to minimize infiltration to groundwater that may recharge area streams.

Table 8-5. Types of Encroachments in Streams and Wetlands of the 404 Project Area

IMPACT AREAS	WETLANDS		STREAM		STREAM IMPACT BY TYPE OF IMPACT (LF)																		Wetland Impact (Acres)	
	Name	Impact Area (Acres)	Tributary Name	Total Impact (LF)	1 - Cut			2 - Cut - Permanent			3 - Culverted			4 - Filled			5 - Filled - Permanent			6 - Filled - Water			Cut	Fill
					P	I	E	P	I	E	P	I	E	P	I	E	P	I	E	P	I	E		
SLOPE ENTRY FACILITIES																								
No. 1			Hoge Run (40632)*																					
	F-52	0.040																					0.040	
	Hoge-2	0.256																					0.078	0.178
No. 2			40632-O	**75**	0	0	28	0	0	0	0	0	0	0	18	29	0	0	0	0	0	0		
			40632-N	**120**	0	0	34	0	0	0	0	0	0	86	0	0	0	0	0	0	0	0		
			40632-N2	**22**	0	0	22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
No. 3			40632-M	**210**	72	0	0	0	0	0	0	0	0	138	0	0	0	0	0	0	0	0		
			40632-Q	**171**	0	0	106	0	0	0	0	0	0	0	0	65	0	0	0	0	0	0		
			40632-R	**160**	0	0	160	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
No. 4			40632-EE	**142**	0	0	0	0	0	0	0	0	0	0	0	142	0	0	0	0	0	0		
			40632-L	**336**	47	0	0	0	0	0	0	0	0	289	0	0	0	0	0	0	0	0		
	Wetland A	0.028																						0.028
	Wetland B	0.001																						0.001
	Wetland C	0.106																						0.106
No. 5			40632-K	**382**	139	0	0	0	0	0	0	0	0	243	0	0	0	0	0	0	0	0		
			40632-K12	**189**	0	97	0	0	0	0	0	0	0	0	92	0	0	0	0	0	0	0		
No. 6			40632-J	**1,775**	0	0	162	0	0	0	0	0	0	1,528	0	85	0	0	0	0	0	0		
			40632-J10	**282**	86	0	0	0	0	0	0	0	0	196	0	0	0	0	0	0	0	0		
			40632-J11	**367**	0	0	0	0	0	0	0	0	0	273	0	94	0	0	0	0	0	0		
			40632-J12	**89**	0	0	0	0	0	0	0	0	0	0	0	89	0	0	0	0	0	0		
			40632-J13	**169**	0	0	0	0	0	0	0	0	0	0	0	169	0	0	0	0	0	0		
			40632-J14	**65**	0	0	0	0	0	0	0	0	0	0	0	65	0	0	0	0	0	0		
			40632-L1	**20**	0	0	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
			40632-L1a	**17**	0	0	17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
			40632-L1a1	**159**	0	0	43	0	0	0	0	0	0	0	0	116	0	0	0	0	0	0		
No. 7			40632-FF	**264**	0	0	104	0	0	0	0	0	0	0	0	160	0	0	0	0	0	0		
No. 8			40633	**199**	82	0	0	0	0	0	0	0	0	117	0	0	0	0	0	0	0	0		
	Hoge-1	0.128																						0.128
No. 9			40632-BB	**238**	0	34	158	0	0	0	0	0	0	0	46	0	0	0	0	0	0	0		
			40632-CC	**191**	0	0	191	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
			40632-DD	**317**	0	0	188	0	0	0	0	0	0	0	39	90	0	0	0	0	0	0		
			40632-I	**517**	312	0	0	0	0	0	0	0	0	205	0	0	0	0	0	0	0	0		
			40632-I1	**26**	0	0	26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	F-44	0.004																						0.004
	F-45	0.024																						0.024
No. 10			Hoge Run (40632)	**108**	42	0	0	0	0	0	66	0	0	0	0	0	0	0	0	0	0	0		
			40632-AAA	**106**	0	0	47	0	0	0	0	0	0	0	25	34	0	0	0	0	0	0		
SUBTOTALS		**0.587**		**6,717**	**780**	**131**	**1,306**	**0**	**0**	**0**	**66**	**0**	**0**	**3,075**	**220**	**1,138**	**0**	**0**	**0**	**0**	**0**	**0**	**0.118**	**0.469**
HAUL ROAD & EQUIPMENT MAINTENANCE FACILITY FOR COAL REFUSE DISPOSAL AREA R3																								
No. 11			40632-GG	**92**	0	0	19	0	0	0	0	0	0	0	0	73	0	0	0	0	0	0		
			40632-H	**342**	0	0	14	0	0	0	0	0	0	0	0	328	0	0	0	0	0	0		
			40632-H1	**212**	0	8	0	0	0	0	0	0	0	0	96	108	0	0	0	0	0	0		
			40632-H1a	**54**	0	0	0	0	0	0	0	0	0	0	0	54	0	0	0	0	0	0		
			40632-H2	**33**	0	0	0	0	0	0	0	0	0	0	0	33	0	0	0	0	0	0		
			40632-H5	**66**	0	0	49	0	0	0	0	0	0	0	0	17	0	0	0	0	0	0		
	F-21	0.052																						0.052
	F-22	0.012																						0.012
	F-28	0.009																						0.009
SUBTOTALS		**0.073**		**799**	**0**	**8**	**82**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**96**	**613**	**0**	**0**	**0**	**0**	**0**	**0**	**0.000**	**0.073**

Table 8-5. Types of Encroachments in Streams and Wetlands of the 404 Project Area

IMPACT AREAS	WETLANDS		STREAM		STREAM IMPACT BY TYPE OF IMPACT (LF)																		Wetland Impact (Acres)	
	Name	Impact Area (Acres)	Tributary Name	Total Impact (LF)	1 - Cut			2 - Cut - Permanent			3 - Culverted			4 - Filled			5 - Filled - Permanent			6 - Filled - Water			Cut	Fill
					P	I	E	P	I	E	P	I	E	P	I	E	P	I	E	P	I	E		
CLEAN COAL STOCKPILE AREA																								
No. 12			40635-L	**1,627**	114	0	0	0	0	0	21	0	0	1,384	0	108	0	0	0	0	0	0		
			40635-L1	**211**	0	0	0	0	0	0	0	0	0	211	0	0	0	0	0	0	0	0		
			40635-L1a	**29**	0	0	0	0	0	0	0	0	0	0	29	0	0	0	0	0	0	0		
			40635-L2	**599**	0	0	0	0	0	0	0	0	0	381	73	145	0	0	0	0	0	0		
			40635-L2a	**70**	0	0	0	0	0	0	0	0	0	0	0	70	0	0	0	0	0	0		
			40635-L2b	**130**	0	0	0	0	0	0	0	0	0	130	0	0	0	0	0	0	0	0		
			40635-L2c	**96**	0	0	0	0	0	0	0	0	0	0	0	96	0	0	0	0	0	0		
			40635-L3	**454**	0	0	0	0	0	0	0	0	0	0	265	189	0	0	0	0	0	0		
			40635-L3a	**222**	0	0	0	0	0	0	0	0	0	0	222	0	0	0	0	0	0	0		
			40635-L4	**370**	0	0	0	0	0	0	0	0	0	370	0	0	0	0	0	0	0	0		
			40635-L5	**334**	0	0	0	0	0	0	0	0	0	207	0	127	0	0	0	0	0	0		
			40635-L5a	**368**	38	0	0	0	0	0	0	0	0	330	0	0	0	0	0	0	0	0		
	Wetland E	0.037																						0.037
SUBTOTALS		**0.037**		**4,510**	**152**	**0**	**0**	**0**	**0**	**0**	**21**	**0**	**0**	**3,013**	**589**	**735**	**0**	**0**	**0**	**0**	**0**	**0**	**0.000**	**0.037**
SHAFT FACILITIES AND ADJACENT SUPPLY YARD																								
No. 13			House Run (40635)	**92**	36	0	0	0	0	0	56	0	0	0	0	0	0	0	0	0	0	0		
	F-4	0.023																						0.023
No. 14			40645-Q	**204**	0	0	170	0	0	0	0	0	0	0	0	34	0	0	0	0	0	0		
SUBTOTALS		**0.023**		**296**	**36**	**0**	**170**	**0**	**0**	**0**	**56**	**0**	**0**	**0**	**0**	**34**	**0**	**0**	**0**	**0**	**0**	**0**	**0.000**	**0.023**
BATCH WEIGH FACILITY																								
No. 15			40644	**198**	0	0	0	12	0	0	0	0	0	0	0	0	186	0	0	0	0	0		
			40644-A	**426**	0	0	0	0	0	0	0	0	0	0	0	0	0	426	0	0	0	0		
No. 16			40628-I	**438**	0	0	26	25	0	0	0	0	0	0	0	0	387	0	0	0	0	0		
			40628-I2	**153**	0	0	20	0	0	97	0	0	0	0	0	0	0	0	36	0	0	0		
			40628-I2a	**54**	0	0	0	0	0	54	0	0	0	0	0	0	0	0	0	0	0	0		
	Wetland G	0.012																					0.012	
SUBTOTALS		**0.012**		**1,269**	**0**	**0**	**46**	**37**	**0**	**151**	**0**	**0**	**0**	**0**	**0**	**0**	**573**	**426**	**36**	**0**	**0**	**0**	**0.012**	**0.000**
WATER SUPPLY IMPOUNDMENT AND ACCESS ROAD																								
No. 17			40645-R	**111**	0	0	43	0	0	0	0	0	0	0	0	68	0	0	0	0	0	0		
			40645-S	**155**	0	0	155	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
			40645-T	**20**	0	0	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
			40645-U	**128**	0	89	0	0	0	0	0	0	0	0	39	0	0	0	0	0	0	0		
			40649	**3,431**	290	0	0	0	0	0	0	0	0	1,265	0	0	0	0	0	1,817	0	59		
			40649-R13	**144**	0	0	0	0	0	0	0	0	0	0	0	144	0	0	0	0	0	0		
			40649-L19	**343**	0	0	0	0	0	0	0	0	0	0	343	0	0	0	0	0	0	0		
			40649-L18	**273**	0	0	0	0	0	0	0	0	0	0	0	273	0	0	0	0	0	0		
			40649-L17	**621**	0	0	0	0	0	0	0	0	0	0	0	621	0	0	0	0	0	0		
			40649-R12	**394**	0	0	0	0	0	0	0	0	0	0	314	80	0	0	0	0	0	0		
			404649-R12a	**182**	0	0	0	0	0	0	0	0	0	0	0	182	0	0	0	0	0	0		
			40649-L16c	**192**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	192		
			40649-L16	**905**	0	0	60	0	0	0	0	0	0	0	0	0	0	0	0	480	167	198		
			40649-L16a	**218**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	218		
			40649-L16b	**206**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	206		
			40649-R11	**168**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	68		
			40649-R9	**350**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	350		
			40649-R10	**69**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	69	0		
			40649-L15	**233**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	64	169		
			40649-L14	**333**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	149	184		
			40649-L13	**464**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	398	0	66		
			40649-R8	**52**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	42		
			40649-R7	**80**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	29	0	51		
			40649-R6	**80**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	80		
			40649-L11	**247**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	247		
			40649-L12	**144**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	144		
			40649-R5	**249**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	111	138		
			40649-L9	**220**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	220		

Table 8-5. Types of Encroachments in Streams and Wetlands of the 404 Project Area

IMPACT AREAS	WETLANDS		STREAM		STREAM IMPACT BY TYPE OF IMPACT (LF)																		Wetland Impact (Acres)	
	Name	Impact Area (Acres)	Tributary Name	Total Impact (LF)	1 - Cut			2 - Cut - Permanent			3 - Culverted			4 - Filled			5 - Filled - Permanent			6 - Filled - Water			Cut	Fill
					P	I	E	P	I	E	P	I	E	P	I	E	P	I	E	P	I	E		
			40649-L10	**126**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	126		
			40649-L8	**207**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	207		
			40649-L7	**194**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	194		
			40649-L6	**145**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	74	0	71		
			40649-R4	**115**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	115	0	0		
			40649-L5	**144**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	144		
			40649-L4	**206**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	94	0	112		
			40649-R3	**230**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	127	103		
			40649-R2	**209**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	209		
			40649-L3	**209**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	181	0	28		
			40649-L2	**134**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	70	0	64		
			40649-L1	**30**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	30		
			40649-R1	**15**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15		
	40649-W1	0.010																						0.010
SUBTOTALS		**0.010**		**11,976**	**290**	**89**	**278**	**0**	**0**	**0**	**0**	**0**	**0**	**1,265**	**696**	**1,367**	**0**	**0**	**0**	**3,258**	**797**	**3,935**	**0.000**	**0.010**
WATER INTAKE STRUCTURE																								
No. 18			South Fork Tenmile Creek (40293)	46	46	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
SUBTOTALS				**46**	**46**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**		
WATER SUPPLY PIPELINE																								
No. 19			S. Fork Tenmile Cr. (40293)	**0**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
			40627-E	**15**	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
			40628-K	**15**	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
			40629	**15**	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
			40630	**15**	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
			40628-J	**15**	0	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
			40628-A	**15**	0	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
			40628-Q	**15**	0	0	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
			Hoge Run (40632)	**0**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
			40628-UNT11	**15**	0	0	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
			House Run (40635)	**0**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
			40645	**20**	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
SUBTOTALS				**140**	**80**	**30**	**30**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**		
COAL REFUSE DISPOSAL AREA CR-1B																								
No. 20A			40636	**2,941**	217	0	0	0	0	0	0	0	0	210	0	0	2,208	0	306	0	0	0		
			40636-M	**257**	0	0	0	0	0	0	0	0	0	0	0	0	257	0	0	0	0	0		
			40636-L	**227**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	227	0	0	0		
			40636-K	**60**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60	0	0	0		
			40636-J	**121**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	121	0	0	0		
			40636-I	**715**	0	0	0	0	0	0	0	0	0	0	0	0	599	0	116	0	0	0		
			40636-I4	**245**	0	0	0	0	0	0	0	0	0	0	0	0	0	61	184	0	0	0		
			40636-I1	**136**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	136	0	0	0		
			40636-I3	**122**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	122	0	0	0		
			40636-I2	**62**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	62	0	0	0		
			40636-H	**99**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	99	0	0	0		
			40636-G	**112**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	112	0	0	0		
			40636-G1	**51**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	51	0	0	0		
			40636-F	**90**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	90	0	0	0		
			40636-E	**189**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	189	0	0	0		
			40636-D	**224**	0	0	0	0	0	0	0	0	0	0	0	0	165	0	59	0	0	0		
			40636-D1	**70**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	70	0	0	0		
			40636-C	**301**	0	0	0	0	0	0	0	0	0	0	0	0	246	55	0	0	0	0		
			40636-B	**311**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	311	0	0	0		
			40636-A	**117**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	117	0	0	0		
SUBTOTALS				**6,450**	**217**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**210**	**0**	**0**	**3,475**	**116**	**2,432**	**0**	**0**	**0**		
COAL REFUSE DISPOSAL AREA R3																								

Table 8-5. Types of Encroachments in Streams and Wetlands of the 404 Project Area

IMPACT AREAS	WETLANDS		STREAM		STREAM IMPACT BY TYPE OF IMPACT (LF)																		Wetland Impact (Acres)	
	Name	Impact Area (Acres)	Tributary Name	Total Impact (LF)	1 - Cut			2 - Cut - Permanent			3 - Culverted			4 - Filled			5 - Filled - Permanent			6 - Filled - Water			Cut	Fill
					P	I	E	P	I	E	P	I	E	P	I	E	P	I	E	P	I	E		
No. 20B			40632 (Hoge Run)	**6,831**	771	0	0	45	0	0	0	0	0	518	0	0	5,474	0	23	0	0	0		
			40632-AAA	**23**	0	23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
			40632-H	**223**	154	0	0	0	0	0	0	0	0	69	0	0	0	0	0	0	0	0		
			40632-H5	**16**	0	0	0	0	0	0	0	0	0	0	0	16	0	0	0	0	0	0		
			40632-HH	**194**	0	0	0	0	0	0	0	0	0	0	0	0	0	194	0	0	0	0		
			40632-GG	**343**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	343	0	0	0		
			40632-P	**2,285**	0	0	0	0	0	33	0	0	0	0	0	0	2,102	0	150	0	0	0		
			40632-P1	**590**	0	0	0	0	0	`	0	0	0	0	0	0	0	0	590	0	0	0		
			40632-P1a	**182**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	182	0	0	0		
			40632-P1b	**215**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	215	0	0	0		
			40632-P1c	**338**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	338	0	0	0		
			40632-P8	**91**	0	0	0	0	0	0	0	0	0	0	0	0	0	91	0	0	0	0		
			40632-P6	**335**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	335	0	0	0		
			40632-P7	**282**	0	0	0	0	0	0	0	0	0	0	0	0	0	282	0	0	0	0		
			40632-P5	**324**	0	0	0	0	0	0	0	0	0	0	0	0	0	19	305	0	0	0		
			40632-P5a	**87**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	87	0	0	0		
			40632-P2	**118**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	118	0	0	0		
			40632-P3	**114**	0	0	0	0	0	0	0	0	0	0	0	0	0	114	0	0	0	0		
			40632-P4	**313**	0	0	0	0	0	0	0	0	0	0	0	0	0	100	213	0	0	0		
			40632-P4a	**81**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	0	0	0		
			40632-P4b	**65**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	65	0	0	0		
			40632-PP	**314**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	314	0	0	0		
			40632-OO	**479**	0	0	0	0	0	0	0	0	0	0	0	0	479	0	0	0	0	0		
			40632-OO1	**102**	0	0	0	0	0	0	0	0	0	0	0	0	0	27	75	0	0	0		
			40632-OO2	**245**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	245	0	0	0		
			40632-OO2a	**60**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60	0	0	0		
			40632-NN	**825**	0	0	0	0	0	0	0	0	0	0	0	0	566	0	259	0	0	0		
			40632-NN8	**204**	0	0	0	0	0	0	0	0	0	0	0	0	204	0	0	0	0	0		
			40632-NN7	**135**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	135	0	0	0		
			40632-NN6	**141**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	141	0	0	0		
			40632-NN5	**108**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	108	0	0	0		
			40632-NN4	**77**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	77	0	0	0		
			40632-NN3	**115**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	115	0	0	0		
			40632-NN2	**58**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	58	0	0	0		
			40632-NN1	**76**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	76	0	0	0		
			40632-XX	**379**	0	0	0	0	0	0	0	0	0	0	0	0	379	0	0	0	0	0		
			40632-WW	**403**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	403	0	0	0		
			40632-MM	**119**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	119	0	0	0		
			40632-VV	**179**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	179	0	0	0		
			40632-UU	**421**	0	0	0	0	0	0	0	0	0	0	0	0	0	100	321	0	0	0		
			40632-LL	**129**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	129	0	0	0		
			40632-KK	**205**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	205	0	0	0		
			40632-JJ	**2,381**	0	0	0	0	0	0	0	0	0	0	0	0	2,092	244	45	0	0	0		
			40632-JJ14	**145**	0	0	0	0	0	0	0	0	0	0	0	0	0	145	0	0	0	0		
			40632-JJ13	**289**	0	0	0	0	0	0	0	0	0	0	0	0	0	68	221	0	0	0		
			40632-JJ12	**105**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	105	0	0	0		
			40632-JJ11	**89**	0	0	0	0	0	0	0	0	0	0	0	0	0	72	17	0	0	0		
			40632-JJ15	**147**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	147	0	0	0		
			40632-JJ10	**108**	0	0	0	0	0	0	0	0	0	0	0	0	0	108	0	0	0	0		
			40632-JJ9	**242**	0	0	0	0	0	0	0	0	0	0	0	0	0	118	124	0	0	0		
			40632-JJ8	**165**	0	0	0	0	0	0	0	0	0	0	0	0	0	165	0	0	0	0		
			40632-JJ7	**199**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	199	0	0	0		
			40632-JJ6	**245**	0	0	0	0	0	0	0	0	0	0	0	0	0	92	153	0	0	0		
			40632-JJ6a	**70**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	70	0	0	0		
			40632-JJ6b	**102**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	102	0	0	0		
			40632-JJ5	**179**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	179	0	0	0		
No. 20B			40632-JJ4	**107**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	107	0	0	0		
			40632-JJ3	**72**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	0	0	0		
			40632-JJ3a	**35**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	35	0	0	0		
			40632-JJ2	**99**	0	0	0	0	0	0	0	0	0	0	0	0	40	0	59	0	0	0		
			40632-JJ2a	**72**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	0	0	0		
			40632-JJ2a1	**24**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24	0	0	0		

Table 8-5. Types of Encroachments in Streams and Wetlands of the 404 Project Area

IMPACT AREAS	WETLANDS		STREAM		STREAM IMPACT BY TYPE OF IMPACT (LF)																		Wetland Impact (Acres)	
	Name	Impact Area (Acres)	Tributary Name	Total Impact (LF)	1 - Cut			2 - Cut - Permanent			3 - Culverted			4 - Filled			5 - Filled - Permanent			6 - Filled - Water			Cut	Fill
					P	I	E	P	I	E	P	I	E	P	I	E	P	I	E	P	I	E		
			40632-JJ1	**50**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50	0	0	0		
			40632-TT	**120**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	120	0	0	0		
			40632-TT1	**101**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	101	0	0	0		
			40632-SS	**251**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	251	0	0	0		
			40632-SS1	**89**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	89	0	0	0		
			40632-RR	**228**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	228	0	0	0		
			40632-RR1	**144**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	144	0	0	0		
	F-19	0.025																						0.025
	HOG-3	0.168																						0.168
	R3-1	0.020																						0.02
	R3-2	0.022																						0.022
	R3-3	0.006																						0.006
	R3-4	0.146																						0.146
	R3-5	0.084																						0.084
	F-16	0.009																						0.009
SUBTOTALS		**0.480**		**23,682**	**925**	**23**	**0**	**45**	**0**	**33**	**0**	**0**	**0**	**587**	**0**	**16**	**11,336**	**1,939**	**8,778**	**0**	**0**	**0**	**0.000**	**0.480**
RAILROAD TRACK SIDING AREA																								
No. 21			40643-O	**92**	0	0	0	0	0	92	0	0	0	0	0	0	0	0	0	0	0	0		
			40643-G	**136**	0	0	0	0	0	136	0	0	0	0	0	0	0	0	0	0	0	0		
No. 22			40647-T1j1	**34**	0	0	0	0	0	0	0	0	0	0	0	34	0	0	0	0	0	0		
			40647-T1j3	**60**	0	0	0	0	0	0	0	0	0	0	0	60	0	0	0	0	0	0		
No. 23			40647	**85**	17	0	0	0	0	0	0	0	0	0	0	0	68	0	0	0	0	0		
			40646	**51**	13	0	0	0	0	0	0	0	0	0	0	0	38	0	0	0	0	0		
No. 24	F-1	0.003																					0.003	
	GRI-1	0.050																					0.023	0.027
No. 25			40643-B	**114**	0	0	0	13	0	0	0	0	0	0	0	30	71	0	0	0	0	0		
No. 26			40628 -H	**59**	0	0	0	0	0	0	0	0	0	0	0	0	59	0	0	0	0	0		
			40628-H3	**76**	0	0	0	0	0	51	0	0	0	0	0	0	0	0	25	0	0	0		
			40628-H4	**88**	0	0	0	0	24	0	0	0	0	0	0	0	0	64	0	0	0	0		
	Wetland F	0.023																					0.023	
No. 27			40631	**100**	18	0	0	0	0	0	0	0	0	0	0	0	82	0	0	0	0	0		
			40631-P	**183**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	183	0	0	0		
			40628-UNT4	**85**	0	0	0	13	0	0	0	0	0	0	0	0	72	0	0	0	0	0		
			40628-UNT6	**106**	0	0	0	0	0	13	0	0	0	0	0	0	0	0	93	0	0	0		
			40628-UNT10	**145**	0	0	0	0	0	23	0	0	0	0	0	70	0	0	52	0	0	0		
No. 28			40628-W	**172**	0	0	0	0	0	172	0	0	0	0	0	0	0	0	0	0	0	0		
			40628-UNT9	**242**	0	0	0	0	0	222	0	0	0	0	0	0	0	12	8	0	0	0		
			40628-UNT9a	**128**	0	0	0	0	0	128	0	0	0	0	0	0	0	0	0	0	0	0		
No. 29			40628-EE	**20**	0	0	0	0	0	20	0	0	0	0	0	0	0	0	0	0	0	0		
			40628-X	**35**	0	0	0	0	35	0	0	0	0	0	0	0	0	0	0	0	0	0		
	F-73	0.007																					0.007	
SUBTOTALS		**0.083**		**2,011**	**48**	**0**	**0**	**26**	**59**	**857**	**0**	**0**	**0**	**0**	**0**	**194**	**390**	**76**	**361**	**0**	**0**	**0**	**0.056**	**0.027**
GRAND TOTALS		**1.305**		**57,895**	**2,574**	**281**	**1,912**	**108**	**59**	**1,041**	**143**	**0**	**0**	**8,150**	**1,601**	**4,098**	**15,774**	**2,557**	**11,607**	**3,258**	**797**	**3,935**	**0.186**	**1.119**

*** 5,731 L.F. to be relocated to a 4,924 L.F. long channel including 171 L.F. of Box Culvert (No. 2 @ 99 L.F.; No.3 @ 72 L.F.)**

Run-off from earth disturbances and permanent facilities will be collected and treated as discussed in Section 6.6 of this document. Treated run-off will be discharged into the fresh water impoundment or future slurry impoundment. These facilities are expected to be operational before longwall mining operations begin. During facility construction and development mining, when the mine is not fully operational and the impoundment may not be completed, run-off will be treated and discharged in accordance with requirements established by PADEP.

Mine water pumped from proposed underground mine operations will be treated in lined ponds, but will not be discharged into the HQ watershed. Treated mine water will be disposed in an approved facility or placed in the future slurry impoundment.

8.3.1.3 Riparian Corridor Impacts

The function of a vegetated stream riparian zone is to filter runoff, provide shade (forested buffers), stabilize stream banks, and provide habitat for terrestrial and semi-aquatic species. Consequently, a land use change within the riparian corridor has the potential to affect overall stream conditions, positively or negatively, depending on the health, width, and vegetative composition of the riparian buffer.

As part of this cumulative impact analysis, potential impacts to riparian area within the proposed Foundation Mine project area have been defined and quantified. The condition and composition of riparian area within the proposed project area was noted by WPI as part of stream delineation activities. Refer to Section 6.2 of this document for descriptive information. Land uses within riparian area of the project site and surrounding CIA area have been determined using 2001 National land Cover Data (NCLD 2001) and Geographical Information System (GIS)

Construction of the Foundation Mine Surface Facilities Complex will encroach on approximately 143 acres of riparian area surrounding impacted streams within the proposed project area. Additionally, 5.4 acres of riparian area not associated with stream encroachment will be impacted due to the construction of ditches, sediment traps, and regrading activities. Riparian area lost due to stream encroachment (143 acres) is approximately 1.1 %of the CIA riparian area. The additional riparian area that will be impacted, 5.4 acres, is 0.04 %of the CIA riparian area. Land use within riparian area that will be lost due to stream encroachment is primarily forested (71.2%) followed by agricultural (17.0%), developed (11.2%), and grassland/herbaceous (< 1%). Land use within the additional riparian area that will be impacted also is primarily forested (70.5%) followed by agricultural (12.2%), developed (16.9 %), and grassland/herbaceous (< 1%).

Loss of the 143-acre riparian area within the project area will result primarily from cutting/filling of adjacent stream channel and will reduce the riparian area of the CIA watershed by only 1.1%, which is not significant. Proposed disturbances to the additional riparian area that will be impacted by proposed construction (5.4 acres) will reduce the riparian area's filtering capacity during construction, however, the proposed facility design provides for sediment barriers to be installed and maintained immediately downgradient of disturbed areas to protect the adjacent

stream until vegetation is re-established. Long term performance of re-vegetated riparian buffer area is not expected to be adversely affected.

8.3.2 Impacts from Past & Current Mining Activities

The Gateway Mine operated within the CIA area from 1921 to 1993. Underground workings of the Gateway Mine extended through the north eastern section of the CIA watershed. Published information regarding surface activity sites for this mine within the CIA area could not be located; therefore, any impact to area streams or wetlands by mine surface activities could not be determined. Furthermore, no comprehensive historic wetland or streams inventories or delineations exist for this part of the CIA area. Given the influences from past mining activities within the CIA area, available chemistry data for nearby streams may be analyzed to deduce not only current stream conditions, but also impacts from past mining activities.

Permitted mining operations currently active within the CIA area include Alpha Natural Resource's Emerald No.1 Mine and Cumberland Mine located within the southern section of the CIA area, and CONSOL Energy's Enlow Fork and Bailey Mines located at the north-western end of the CIA area. Refer to Figures 8-1 and 8-2 for the mine locations.

Surface activity sites related to the four existing mining operations within the CIA area are presented on Table 8-6 along with corresponding surface areas. Collectively, they occupy approximately 888 acres or 0.77 %of the CIA area.

8.3.2.1 Stream and Wetland Encroachment Impacts

Stream lengths that may have been impacted by the existing surface activity sites (perennial, intermittent, and ephemeral channels) are shown on Table 8-7. They total approximately 27,095 linear feet. Stream lengths presented in Table 8-7 were determined by applying the "factor" established in Section 8.2.4 of this document to the stream lengths indicated by USGS aerial photography and topographic mapping. Comparison of USGS streams with PADEP's Stream Network indicates stream lengths from both sources are roughly the same.

Wetlands impacted by the surface activity sites could not be estimated since NWI Wetland Mapping displays only the current status of wetland data.

In addition to impacts within the CIA area due to past or current mining activities, there were additional stream length impacts due to past non-surface mining activities within the Browns Creek and Lower South Fork Tenmile Creek watersheds, as shown on Table 8-8. Total length of stream impact due to the non-surface mining activities is estimated to be 14,679 linear feet. These impacted stream lengths were estimated by comparing the USGS Waynesburg Topographic Quadrangle Maps of 1904 and 2010.

Table 8-6. Surface Mining Activity Site Areas Within the CIA Watershed

Surface Mining Acitivity Site	Mine Surface Facilty Area (acres) Within the CIA Area Sub-Watersheds					
	Browns Creek	Upper South Fork Tenmile Creek	McCourtney Run	Pursley Creek	Ruff Creek	Lower South Fork Tenmile Creek
Cumberland No. 9 Shaft				61		
Emerald No. 5 Shaft				11		
Emerald No. 1 Bleeder Shaft				12		
Emerald No. 3 Shaft						12
Emerald No. 4 Shaft						41
Emerald No. 6I & 6R Shafts						39
Emerald Coal Refuse Disposal Area No. 1						153
Emerald Coal Refuse Disposal Area No. 2		17				156
Emerald Mine No. 1 Prep Plant & Batch Weigh Loadout		22				157
Emerald No. 2I and 2R Shafts		15				
Emerald No. 7 Shaft						53
Emerald No. 8 & No. 4 Bleeder shafts						77
CONSOL Energy - Bailey Central Mine Complex		51				
CONSOL Energy - Bailey 1A Bleeder Shaft	11					
Total Per Watershed (acres):	**11**	**106**	**0**	**84**	**0**	**687**
Total Within CIA Area (acres):						**888**

Table 8-7. Estimated Stream Encroachment Length Due to Existing Surface Mining Activity within the CIA Watershed

Surface Mining Activity Site *	Estimated Stream Length Impact Within the CIA Area Sub-Watersheds (L.F.)					
	Browns Creek	Upper South Fork Tenmile Creek	McCourtney Run	Pursley Creek	Ruff Creek	Lower South Fork Tenmile Creek
Cumberland No. 9 Shaft				0		
Emerald No. 5 Shaft				350		
Emerald No. 1 Bleeder shaft				0		
Emerald No. 3 shaft						0
Emerald No. 4 Shaft						4,565
Emerald No. 6I & 6R shafts						2,562
Emerald Coal Refuse Disposal Area No. 1						8,039
Emerald Coal Refuse Disposal Area No. 2						8,250
Emerald Mine No. 1 Prep Plant & Batch Weigh Loadout		2,000				
Emerald No. 2I and 2R Shafts		0				
Emerald No. 7 Shaft						0
Emerald No. 8 & No. 4 Bleeder shafts						1,330
CONSOL Enery - Bailey Central Mine Complex		0				
CONSOL Energy - Bailey 1A Bleeder Shaft	0					
Total Per Watershed (L.F.):	0	2,000	0	350	0	24,745
Total Within CIA Area (L.F.):						**27,095**

* Stream encroachment lengths were estimated based on a review of USGS aerial photography and topographic mapping which present the same lengths as the PADEP Stream Network data. Lengths obtained from these data sources were adjusted by a factor of 2.33 as explained in Section 8.2.4 and Table 8-3 of this document.

Table 8-8. Estimated Stream Encroachment Length within the CIA Due to Non-Surface Mining Activities

Non-Surface Mining Activity*	Estimated Stream Length Impact Within the CIA Area Watersheds (L.F.)					
	Browns Creek	**Upper South Fork Tenmile Creek**	**McCourtney Run**	**Pursley Creek**	**Ruff Creek**	**Lower South Fork Tenmile Creek**
Waynesburg Water Company Dam	7,689					
Waynesburg Walmart						2,330
Norfolk Southern Railroad						4,660
Total Per Watershed (L.F.):	7,689	0	0	0	0	6,990
Total Within CIA Area (L.F.):						**14,679**

* Stream encroachment lengths were estimated based on a review of USGS aerial photography and topographic mapping which present the same lengths as the PADEP Stream Network data. Lengths obtained from these data sources were adjusted by a factor of 2.33 as explained in Section 8.2.4 and Table 8-3 of this document.

TABLE 8-9. Water Quality Within the CIA Watershed

Sample Point	Sample Source	Stream	Sample Duration	No. of Samples		Flow (gpm)	Field pH	Lab pH	Temperature (°C)	Alkalinity mg/l	Acidity (mg/l)	Iron (mg/l)	Aluminum (mg/L)	Manganese (mg/L)	Sulfate (mg/l)	Suspended Solids (mg/l)	Specfic Conductance (m-mho)
Pursley Creek																	
S-60	**Cumberland #9 Shaft**	**Maple Run - Upstream**	1/12/2006 - 6/13/2006	6	min	85.0	6.02	5.85	5.10	26.00	<2	<0.05	<0.05	<0.05	20	6.0	120
					max	2245.0	7.56	7.13	19.50	70.00	<2	0.84	<0.05	<0.05	46	34.0	176
					avg	**651.0**	**6.88**	**6.68**	**12.33**	**42.37**	**<2**	**0.30**	**<0.05**	**<0.05**	**27**	**15.7**	**150**
S-69A	**Cumberland #9 Shaft**	**Maple Run - Downstream**	9/21/2006 3/28/2007	6	min	11.8	3.87	6.19	2.60	20.00	<2	<0.05	<0.05	<0.05	14	2.0	12
					max	5206.4	8.36	7.24	25.00	84.00	<2	0.67	0.42	<0.05	38	36.0	208
					avg	**1601.8**	**6.28**	**6.82**	**14.25**	**48.67**	**<2**	**0.15**	**0.11**	**<0.05**	**24**	**11.7**	**145**
ST50-3144	**Cumberland Mine West Expansion**	**Pursley Creek - Upstream**	10/31/2006 - 4/10/2007	5	min	0.0	7.25	6.40	2.50	43.27	-45.96	0.12	0.02	<0.02	22	<1.0	165
					max	4782.6	8.87	8.03	15.90	62.37	-22.55	2.14	2.22	1.89	31	6.0	225
					avg	**3115.1**	**8.05**	**7.00**	**8.95**	**53.39**	**-34.65**	**0.57**	**0.54**	**0.40**	**27**	**3.2**	**208**
3072865	**USGS Point**	**Pursley Creek - Downstream**	4/22/1980 - 8/13/1998	5	min	206.5	7.00	7.60	11.00	-	-	0.20	0.00	0.03	25	-	238
					max	9873.6	8.70	8.00	28.00	-	-	1.70	0.30	0.48	59	-	509
					avg	**3454.0**	**7.73**	**7.90**	**21.50**	**-**	**-**	**1.03**	**0.10**	**0.11**	**35**	**-**	**258**
Upper South Fork Tenmile Creek																	
WQN7031	**EPA**	**South Fork Tenmile Creek - Upstream**	8/11/1998 - 12/03/1998	5	min	-	7.20	7.20	4.00	-	-	0.41	0.16	0.07	29	-	180
					max	-	7.50	7.70	24.00	-	-	0.60	0.26	0.32	32	-	330
					avg	**-**	**7.46**	**7.36**	**12.74**	**-**	**-**	**0.50**	**0.21**	**0.15**	**31**	**-**	**240**
48228	**PA DEP Wave**	**South Fork Tenmile Creek - Upstream**	10/23/1998 - 6/6/2000	16	min	45.0	6.90	6.40	4.00	48.00	-	0.18	0.08	0.04	22	2.0	80
					max	44880.0	7.60	7.70	22.00	166.00	-	1.42	1.07	0.38	82	412.0	300
					avg	**6547.0**	**7.23**	**7.21**	**10.60**	**103.40**	**-**	**0.56**	**0.27**	**0.11**	**36**	**35.1**	**172**
19810	**PA DEP Wave**	**South Fork Tenmile Creek - Downstream**	23-Mar-01	1		**-**	**7.60**	**-**	**-**	**66.00**	**-**	**0.33**	**-**	**0.05**	**36**	**8.0**	**-**
SW-1	**Emerald Mine**	**South Fork Tenmile Creek - Downstream**	3/2/1992 - 9/24/1994	11	min	1.0	7.40	7.80	3.50	55.00	-208.00	0.05	0.01	0.02	64	2.0	220
					max	799.0	8.40	8.40	18.90	214.00	0.00	0.80	0.10	0.60	625	29.0	2230
					avg	**232.9**	**7.71**	**8.10**	**11.74**	**130.51**	**-84.90**	**0.19**	**0.03**	**0.18**	**278**	**7.9**	**1233**
Lower South Fork Tenmile Creek																	
SW-30	**Emerald Mine NE Panel**	**Sugar Run - Downstream**	11/26/1996 - 7/16/1997	6	min	400.0	7.80	7.80	3.20	90.00	-194.00	0.05	0.10	0.04	44	<5.0	270
					max	2566.0	8.00	8.60	11.00	207.00	-78.00	1.70	1.40	0.40	47	41.0	520
					avg	**1593.0**	**7.90**	**8.11**	**5.68**	**118.33**	**108.50**	**0.57**	**0.57**	**0.12**	**45**	**14.0**	**340**
SW-24	**Emerald Mine NE Panel**	**Laurel Run - Upstream**	11/26/1996 - 7/16/1997	6	min	0.0	7.70	7.70	1.00	58.00	-97.00	0.10	0.20	0.04	31	<5.0	<5.0
					max	2947.0	8.00	8.20	14.00	113.00	-51.00	0.80	0.40	0.50	55	23.0	330
					avg	**1352.3**	**7.90**	**7.91**	**5.42**	**73.00**	**-64.50**	**0.32**	**0.13**	**0.25**	**43**	**10.2**	**211**
3072930	**USGS Point**	**Laurel Run - Downstream**	8/30/1979 - 8/19/1981	4	min	18.0	7.20	7.60	17.00	-	-	0.41	-	0.14	45	-	300
					max	1750.3	8.70	7.60	26.00	-	-	1.10	-	0.30	160	-	580
					avg	**969.4**	**7.90**	**7.60**	**22.25**	**-**	**-**	**0.62**	**-**	**0.02**	**79**	**-**	**375**
SW-16	**Emerald Mine #6I & 6R Shafts**	**Smith Creek - Upstream**	2/27/1993 - 6/23/1993	3	min	40.0	7.40	6.50	2.80	51.00	-82.00	0.12	0.01	0.20	28	3.0	130
					max	109.0	8.00	7.90	19.60	106.00	-28.00	0.45	0.03	0.30	44	13.0	290
					avg	**80.0**	**7.76**	**7.34**	**10.43**	**68.67**	**-51.00**	**0.26**	**0.02**	**0.27**	**34**	**6.7**	**217**
ST-10	**Proposed Emerald Mine Refuse Area #3**	**Smith Creek - Downstream (US of Disposal Area)**	12/14/2006 - 1/07/2008	7	min	1000.9	7.21	6.82	2.78	42.00	-91.03	<0.05	<0.05	<0.05	36	1.0	245
					max	7585.2	8.36	7.96	26.63	172.00	<2	0.20	0.10	0.03	78	30.0	565
					avg	**3385.5**	**7.91**	**7.36**	**10.05**	**134.17**	**14.72**	**0.09**	**0.06**	**0.05**	**54**	**11.0**	**405**
3072915	**USGS Point**	**Smith Creek - Downstream**	8/31/1979 - 8/20/1981	4	min	35.9	7.40	-	14.00	-	-	0.19	-	0.04	39	-	290
					max	4218.7	8.90	8.00	22.00	-	-	0.83	0.20	0.20	75	-	570
					avg	**2219.3**	**7.93**	**8.00**	**17.63**	**-**	**-**	**0.58**	**0.20**	**0.11**	**55**	**-**	**390**
3073000	**USGS Point**	**South Fork Tenmile Creek - Downstream**	10/15/1953 8/20/1981	20	min	1481.0	6.50	8.20	4.00	-	-	0.06	-	0.02	28	-	150
					max	1000824.0	8.80	8.20	28.00	-	-	17.50	-	0.60	127	-	820
					avg	**100306.8**	**7.91**	**8.20**	**15.39**	**-**	**-**	**1.81**	**-**	**0.14**	**59**	**-**	**381**
					min	-	-	6.30	-	-	-	0.40	0.00	-	8	-	-

TABLE 8-9. Water Quality Within the CIA Watershed

Sample Point	Sample Source	Stream	Sample Duration	No. of Samples		Flow (gpm)	Field pH	Lab pH	Temperature (^oC)	Alkalinity mg/l	Acidity (mg/l)	Iron (mg/l)	Aluminum (mg/L)	Manganese (mg/L)	Sulfate (mg/l)	Suspended Solids (mg/l)	Specfic Conductance (m-mho)
WQN7013	EPA	South Fork Tenmile Creek - Downstream	1950	>30	max	-	-	8.00	-	-	-	7.00	18.00	-	720	-	-
					avg	**-**	**-**	**7.18**	**-**	**-**	**-**	**1.82**	**4.46**	**-**	**85**	**-**	**-**
			1960	>28	min	269.3	4.50	6.50	0.00	-	-	0.00	-	0.00	8	-	-
					max	2499816.0	8.80	8.50	26.00	-	-	32.00	-	0.40	720	-	-
					avg	**126536.4**	**7.58**	**7.38**	**10.87**	**-**	**-**	**1.83**	**-**	**0.04**	**79**	**-**	**-**
			1970	>18	min	807.8	4.00	5.90	0.00	-	-	0.10	0.20	0.02	27	-	150
					max	888624.0	8.80	8.80	31.00	-	-	23.50	1.38	1.28	440	-	900
					avg	**103670.2**	**7.51**	**7.67**	**11.77**	**-**	**-**	**1.53**	**0.89**	**0.15**	**59**		**396**
			1980	>47	min	67320.0	6.70	6.20	1.00	-	-	0.09	0.10	0.02	16	-	158
					max	67320.0	8.90	8.60	27.00	-	-	44.20	25.30	1.49	230	-	2400
					avg	**83691.5**	**7.72**	**7.33**	**13.96**	**-**	**-**	**1.31**	**4.05**	**0.15**	**104**	**-**	**1901**
Browns Creek																	
1343923	**PA DEP Wave**	**Bates Fork - Upstream**	25-Jul-08	1		**-**	**7.40**	**7.60**	**-**	**948.60**	**-**	**1.74**	**-**	**0.02**	**15**	**-**	**21**
3072875	**USGS Point**	**Browns Creek - Upstream**	8/28/1979 - 9/06/1980	3	min	1122.0	8.00	-	11.00	-	-	0.19	-	0.04	29	-	240
					max	2333.8	9.00	-	25.00	-	-	0.42	-	0.10	35	-	410
					avg	**1557.3**	**8.12**	**-**	**19.67**	**-**	**-**	**0.33**	**-**	**0.06**	**32**	**-**	**307**
3072910	**USGS Point**	**Browns Creek - Downstream**	8/30/1979 - 8/20/1981	4	min	1391.3	7.20	7.40	13.00	-	-	0.33	-	0.04	24	-	220
					max	17503.2	8.00	7.40	25.00	-	-	2.70	-	0.16	34	-	360
					avg	**10636.6**	**7.63**	**7.40**	**19.75**	**-**	**-**	**1.26**	**-**	**0.09**	**29**	**-**	**274**
Ruff Creek																	
3072945	**USGS Point**	**Ruff Creek - Upstream**	8/29/1979 - 9/01/1981	4	min	188.5	7.30	8.10	16.00	-	-	0.06	-	0.02	28	-	225
					max	4443.1	8.50	8.10	25.00	-	-	1.00	-	0.11	36	-	290
					avg	**1795.2**	**7.91**	**8.10**	**18.38**	**-**	**-**	**0.52**	**-**	**0.06**	**32**	**-**	**265**
3072985	**USGS Point**	**Ruff Creek - Downstream**	8/31/1979 - 8/20/1981	4	min	1211.8	7.90	7.90	12.00	-	-	0.15	0.10	0.01	41	-	505
					max	10771.2	8.50	7.90	22.00	-	-	0.74	0.10	0.11	140	-	1100
					avg	**5197.1**	**8.22**	**7.90**	**17.63**	**-**	**-**	**0.37**	**0.10**	**0.05**	**91**	**-**	**748**
McCourtney Run																	
#100	**Foundation Mine Surface Facilities**	**Hoge Run - Upstream**	1/28/2008 - 1/6/2010	25	min	<1.0	7.00	6.50	1.90	42.70	-234.10	0.10	<0.03	<0.03	10	<1.0	231
					max	1438.1	8.70	8.30	27.20	248.40	-13.60	2.50	1.93	1.30	43	119.0	284
					avg	**129.3**	**7.93**	**7.73**	**14.10**	**106.30**	**-79.80**	**0.50**	**0.18**	**0.30**	**24**	**14.9**	**256**
ST22-3034	**Foundation Mine Surface Facilities**	**Hoge Run - Downstream**	12/19/2006 - 3/09/2009	22	min	1.1	6.91	6.50	1.40	40.66	-86.02	0.02	0.02	0.02	19	1.0	140
					max	368.5	8.99	8.24	23.50	119.43	-24.53	2.10	0.37	1.36	29	41.0	310
					avg	**369.5**	**7.85**	**7.43**	**14.40**	**79.39**	**-54.56**	**0.29**	**0.10**	**0.20**	**25**	**6.4**	**224**
H	**Foundation Mine Surface Facilities**	**House Run - Upstream**	9/29/2007 - 10/01/2009	24	min	0.0	7.40	6.60	1.80	32.70	-84.70	<0.03	<0.02	<0.02	15	<1.0	123
					max	6619.1	8.70	8.10	21.90	116.30	-20.40	1.10	0.54	0.20	37	20.0	389
					avg	**1012.4**	**7.95**	**7.50**	**13.60**	**73.60**	**-49.00**	**0.20**	**0.17**	**0.06**	**23**	**3.1**	**203**
2A	**Foundation Mine Surface Facilities**	**House Run - Downstream**	11/8/2007 - 9/10/2009	24	min	0.4	7.60	6.50	1.40	33.20	-101.20	0.02	0.04	0.02	15	<1.0	123
					max	5194.3	8.80	8.30	24.30	125.90	-16.30	0.33	0.32	0.33	42	9.0	331
					avg	**566.2**	**7.94**	**7.75**	**13.70**	**75.70**	**-52.20**	**0.06**	**0.14**	**0.06**	**23**	**2.2**	**206**
ST63-3041	**Foundation Mine Surface Facilities**	**McCourtney Run - Upstream**	1/9/2007 - 2/13/2009	9	min	0.9	6.75	6.55	0.60	35.19	-87.65	0.08	0.06	<0.02	20	<1.0	169
					max	19870.0	8.70	7.79	22.80	125.81	-20.74	1.09	1.16	0.08	38	84.0	230
					avg	**1892.7**	**7.78**	**7.37**	**11.07**	**80.99**	**-56.87**	**0.31**	**0.25**	**0.04**	**28**	**22.8**	**200**

TABLE 8-9. Water Quality Within the CIA Watershed

Sample Point	Sample Source	Stream	Sample Duration	No. of Samples		Flow (gpm)	Field pH	Lab pH	Temperature (^{o}C)	Alkalinity mg/l	Acidity (mg/l)	Iron (mg/l)	Aluminum (mg/L)	Manganese (mg/L)	Sulfate (mg/l)	Suspended Solids (mg/l)	Specfic Conductance (m-mho)
1	Foundation Mine Surface Facilities	McCourtney Run - Middle	9/29/2007 - 10/1/2009	23	min	1.7	7.50	6.90	1.30	39.00	-95.80	0.10	0.04	<0.02	19	<1.0	148
					max	11041.2	8.70	8.10	24.50	128.30	-19.70	1.30	0.70	0.40	37	47.0	407
					avg	**1766.9**	**8.02**	**7.56**	**14.10**	**84.10**	**-56.40**	**0.30**	**0.20**	**0.10**	**25**	**5.7**	**252**
3072860	USGS Point	McCourtney Run - Downstream	8/30/1979 - 8/19/1981	4	min	31.4	6.60	7.70	14.00	-	-	0.33	0.30	0.04	29	-	220
					max	10322.4	8.90	7.70	22.00	-	-	1.60	0.30	0.16	33	-	315
					avg	**4249.0**	**7.73**	**7.70**	**19.12**	**-**	**-**	**0.89**	**0.30**	**0.10**	**32**	**-**	**258**
3072855	USGS Point	Hargus Creek - Downstream	8/30/1979 - 8/19/1981	4	min	9.0	6.40	7.70	14.00	-	-	0.26	-	0.03	27	-	195
					max	4488.0	8.50	7.70	23.00	-	-	2.20	-	0.48	34	-	245
					avg	**2033.0**	**7.41**	**7.70**	**18.90**	**-**	**-**	**1.05**	**-**	**0.18**	**31**	**-**	**218**

8.3.2.2 Water Quality Impacts

Stream water quality sampling data from the following sources were reviewed to evaluate water quality impacts due to past and current mining activities.

- USGS stream sampling data
- EPA stream sampling data
- PADEP Wave (Water Attribute Viewer and Extracts) stream sampling data
- Coal Mining Operation stream sampling data available in-house

Stream sampling locations are shown on Figure 8-2. Analytical data for samples from these locations are summarized in Table 8-9 which presents minimum, maximum, and average values determined for each data point.

8.3.2.2.1 McCourtney Run Sub-Watershed

Of the six sub-watersheds forming the CIA area, there is no evidence of past or existing mining activities within the McCourtney Run watershed. Analytical data shown on Table 8-9 indicate the McCourtney Run watershed has not been impacted by mining activities. Data developed between August 30, 1979 and January 6, 2010 for major tributaries within the watershed were evaluated and the data developed for sampling location were averaged as indicated on Table 8-9. Table 8-10 presents the range in average values established for each of the water quality parameters analyzed.

Table 8-10. Summary of McCourtney Run Sub-Watershed Water Quality Data

Parameter	Range of Average Values
pH (s.u.)	7.37 to 7.75
Iron (mg/l)	0.06 to 1.05
Aluminum (mg/l)	0.10 to 0.3
Manganese (mg/l)	0.04 to 0.3
Sulfate (mg/l)	23 to 32
Specific Conductance (micromhos/cm)	200 to 258

Data for all the parameters indicate compliance with Chapter 93 Water Quality Standards.

8.3.2.2.2 Pursley Creek Sub-Watershed

Existing surface mining activities within the Pursley Creek sub-watershed include Cumberland No.9 Shaft, Emerald No.5 Shaft, and Emerald No.1 Bleeder Shaft. Stream sampling within the

Pursley Creek watershed was performed at four locations during various periods between April 22, 1980 and April 10, 2007. Data developed for each data point were averaged as indicated on Table 8-9. Table 8-11 presents the range in average values established for each of the water quality parameters analyzed.

Table 8-11. Summary of Pursley Creek Sub-Watershed Water Quality Data

Parameter	Range of Average Values
pH (s.u.)	6.68 to 7.90
Iron (mg/l)	0.15 to 1.03
Aluminum (mg/l)	0.05 to 0.54
Manganese (mg/l)	0.05 to 0.40
Sulfate (mg/l)	24.0 to 35.0
Specific Conductance (micromhos/cm)	145 to 258*

* Includes a one-time high value of 509 micromhos/cm

All values are in general compliance with Chapter 93 Water Quality Standards.

8.3.2.2.3 Upper South Fork Tenmile Creek Sub-Watershed

Existing surface mining activities within Upper South Fork Tenmile Creek sub-watershed include a small section of Emerald Refuse Disposal Area No.2 containing ancillary facilities, Emerald Mine No.1 Preparation Plant & Batch Weigh Loadout, Emerald No. 2I and 2R Shafts, and a relatively small section of the CONSOL Energy Bailey Central Mine Complex. Stream samples were collected at four locations within the watershed during various periods between March 2, 1992 and March 21, 2001. Data developed for each data point were averaged as indicated on Table 8-9. Table 8-12 presents the range in average values established for each of the water quality parameters analyzed.

Table 8-12. Summary of Upper South Fork Tenmile Creek Sub-Watershed Water Quality Data

Parameter	Range of Average Values
pH (s.u.)	7.21 to 8.10
Iron (mg/l)	0.19 to 0.56
Aluminum (mg/l)	0.03 to 0.27
Manganese (mg/l)	0.05 to 0.18
Sulfate (mg/l)	31 to 278
Specific Conductance (micromhos/cm)	172 to 1233

Sulfate concentrations were slightly higher than public water supply limitation of 250 mg/l. These water quality data, particularly the elevated sulfate concentration and elevated specific conductance, are indicative of some water quality impacts due to existing mining.

8.3.2.2.4 Browns Creek Sub-Watershed

The only existing surface mining activity site that could be identified within the Browns Creek sub-watershed of the CIA area is CONSOL Energy's Bailey 1A Bleeder Shaft site which occupies 11.3 acres near the headwaters of a tributary to Patterson Creek – a tributary to Browns Creek. Stream samples were collected from three locations within the Browns Creek watershed during various periods between August 28, 1979 and July 25, 2008. Data developed for each data point were averaged as indicated on Table 8-9. Table 8-13 presents the range in average values established for each of the water quality parameters analyzed.

Table 8-13. Summary of Browns Creek Sub-Watershed Water Quality Data

Parameter	Range of Average Values
pH (s.u.)	7.4 to 7.6
Iron (mg/l)	0.33 to 1.74
Aluminum (mg/l)	Not Analyzed
Manganese (mg/l)	0.02 to 0.09
Sulfate (mg/l)	15 to 32
Specific Conductance (micromhos/cm)	21 to 307*

* Includes a maximum value of 410 micromhos/cm

Although the range of average iron concentrations is slightly above the Chapter 93 Water Quality Standard of 1.5 mg/l for a 30-day average, these water quality data are indicative of a sub-watershed with no significant detectable direct stream impact from current or past mining activities.

8.3.2.2.5 Ruff Creek Sub-Watershed

Old mine mapping shows the Ruff Creek sub-watershed is extensively undermined, but no surface mining activity sites could be identified within this sub-watershed. Stream samples were collected from two locations within the Ruff Creek watershed between August 29,1979 and September 1, 1981. Data developed for each data point were averaged as indicated on Table 8-9. Table 8-14 presents the range in average values established for each of the water quality parameters analyzed.

Table 8-14. Summary of Ruff Creek Sub-Watershed Water Quality Data

Parameter	Range of Average Values
pH (s.u.)	7.9 to 8.1
Iron (mg/l)	0.37 to 0.52
Aluminum (mg/l)	0.10
Manganese (mg/l)	0.05 to 0.06
Sulfate (mg/l)	32 to 91
Specific Conductance (micromhos/cm)	265 to 748*

* Includes a maximum value of 1100 micromhos/cm

Only the elevated value of specific conductance suggests a slight water quality impact, but considering the other data, it suggests impacts from activities other than existing or past mining.

8.3.2.2.6 Lower South Fork Tenmile Creek Sub-Watershed

Lower South Fork Tenmile Creek sub-watershed contains most of the surface mining activities sites identified within the CIA area watershed. These surface mining activities sites include shaft sites and disposal facilities for Emerald Mine as noted on Table 8-6, as well as, the Emerald Mine preparation plant and coal load-out facility. Most of these surface activity sites are located within the watersheds of Smith Creek, Sugar Run, Laurel Run, and Coal Lick Run which are tributaries to South Fork Tenmile Creek. As shown on Table 8-9, data from three sampling points in Smith Creek, one sampling point in Sugar Run, two sampling points in Laurel Run, and two sampling points on South Fork Tenmile Creek at the downstream end of the sub-watershed are available to study impacts on the water quality of this sub-watershed. Data developed for

each data point were averaged as indicated on Table 8-9. Table 8-15 presents the range in average values established for each of the water quality parameters analyzed.

Table 8-15. Summary of Lower South Fork Tenmile Creek Sub-Watershed Water Quality Data

Parameter	Range of Average Values			
	Smith Creek * (US of Disposal)	Smith Creek (DS of Disposal)	Sugar Run & Laurel Run	South Fork Tenmile Creek
pH (s.u.)	7.34 to 7.36	8.0	7.60 to 8.11	7.18 to 8.20
Iron (mg/l)	0.09 to 0.26	0.58	0.32 to 0.62	1.31 to 1.83
Aluminum (mg/l)	0.02 to 0.06	0.20	0.13 to 0.57	0.89 to 4.46
Manganese (mg/l)	0.05 to 0.27	0.11	0.02 to 0.25	0.04 to 0.15
Sulfate (mg/l)	34 to 54	55	43 to 79	59 to 104
Specific Conductance (micromhos/cm)	217 to 405**	390*	211 to 375	381 to 1901

* Both SW-16 and ST-10 are located upstream of the Emerald disposal areas.

** Includes maximum values of 565 and 570 micromhos/cm upstream and downstream of the disposal areas, respectively.

Smith Creek. Stream samples were collected from Smith Creek during the periods between August 31, 1979 and January 7, 2008. Samples were collected both upstream and downstream of the coal refuse disposal facilities, the first of which was in operation in 1977. The data summary presented in Table 8-15 indicates some water quality impacts in Smith Creek due to surface mining activities.

Sugar Run and Laurel Run. Stream sampling was performed in Sugar Run and Laurel Run during periods between August 30, 1979 and July 16, 1997. Sampling was performed at one location in Sugar Run and two in Laurel Run. Average values for each of the water quality parameters analyzed are summarized in Table 8-15. Average values reported for iron and aluminum include maximum values of 1.70 mg/l and 1.40 mg/l, respectively which are higher than the Chapter 93Water Quality Standards (a 30-day average value of 1.50 mg/l for iron, and 0.75 mg/l for aluminum). The specific conductance range included a maximum value of 580 micromhos/cm. These data indicate a very small, detectable, direct impact from past mining activities but the impact is not considered significant.

South Fork Tenmile Creek. Two available data points in South Fork Tenmile Creek are located towards the eastern end of the watershed. The two sampling points are located very close to each other. One location was sampled by USGS during the period between October 15, 1953 and August 20, 1981 and the other sampled by US EPA during the period between 1950 and 1980. Data from these sampling locations were considered to further evaluate water quality impacts due to past mining activities in the sub-watershed.

Ranges in average values determined for each of the water quality parameters analyzed are summarized in Table 8-15. As indicated by Table 8-9, average values reported for iron, aluminum, manganese, sulfate, and conductivity include maximum values that are considerably higher than the reported average values. Generally the maximum values were for samples obtained during the most recent sampling period (1980). The high concentration of iron and

aluminum with a relatively higher sulfate content and high specific conductance usually are associated with mining discharges and are indicative of a watershed with detectable direct water quality impacts from current or past mining activities. It is likely, therefore, that a reduced macro-invertebrate population will exist in sections of the Lower South Fork Tenmile Creek sub-watershed compared to the other five (5) sub-watersheds of the CIA area.

8.3.3 Impacts from Concurrent & Reasonably Foreseeable Future Activities

The presently proposed Foundation Mine Surface Facilities Complex will be developed to mine, process, and market Pittsburgh Seam coal. Although, at this time, it is difficult to project with certainty the concurrent or future needs of this operation, the future activities discussed in this section have been preliminarily identified and may occur as Foundation Mine operations advance through the initial mining process.

If a decision is made to implement any of these possible future activities, stream and wetland delineations and a jurisdictional determination would be made at the proposed site. A functional assessment of existing resources at the site and probable degree of impact would be made after the alternatives analysis is completed and the most feasible site identified. Request for a 404 permit for any stream/wetland encroachments then would be submitted as a supplement to this 404 Permit Application.

8.3.3.1 Sewickley Seam Shaft Site

The Sewickley Coal seam is approximately 100 feet above the Pittsburgh Coal seam within the Foundation Mine permit boundary. FMLLC may decide to mine this coal and process it through the Foundation Mine Surface Facilities Complex. Since the Sewickley seam is inconsistent in thickness, it is likely to be mined only in selected areas using room and pillar mining techniques. To access the seam and mine the Sewickley coal, a shaft and slope would be needed.

The proposed Sewickley seam shaft site most likely would encompass 10 to 15 acres within the House Run watershed near Holbrook in Greene County, Pennsylvania. House Run drains to McCourtney Run which flows to Hargus Creek to South Fork Tenmile Creek. The Sewickley Shaft site would be used as access for the personnel and material supplies to the Sewickley seam. The Sewickley Slope would be constructed to bring mined Sewickley Coal to the surface to process and transport to the market by the Foundation Mine Surface Facilities complex.

The Sewickley slope would be constructed from the slope pad developed for Foundation Mine to mine the Pittsburgh seam; therefore Sewickley slope construction would not require further impact to area streams or wetlands.

8.3.3.2 Future Bleeder Shaft Site

Within three (3) to four (4) years following initiation of underground mining activities in the Pittsburgh seam of Foundation Mine, construction of a bleeder shaft at the end of the first longwall panel will be needed for ventilation purposes. The location required for the bleeder shaft will be based on mine ventilation requirements and will not be established until the longwall panel layout has been finalized and mining operations have begun. Although no specific future bleeder shaft site has been identified at this time, to the extent practicable, FMLLC will make every effort to identify a potential shaft site that avoids and/or minimizes potential impacts to Waters of The United States.

8.3.3.3 Future Coal Refuse Disposal Areas

FMLLC has identified two (2) coal refuse disposal areas: 1) R-3, a slurry impoundment primarily for fine coal refuse disposal but including a coarse coal refuse dam; and 2) CR-1B, a coarse/combined coal refuse disposal area. Both sites have been approved by PADEP for subsequent facility design and permitting. Slurry impoundment R-3 will provide 20 years of storage capacity for fine coal refuse and coarse/combined coal refuse disposal area CR-1B will provide approximately 14 years of storage capacity. Considering the life of the mine is 20 years, disposal of coarse coal refuse for the remaining 6 years of mine life after the capacity of CR-1B has been exhausted will require an additional coarse coal refuse disposal area assuming the same rates of coal refuse generation.

The location of the future coarse coal refuse disposal area is not known at this time. It is preliminarily estimated that approximately 13 million cubic yards of additional coarse coal refuse storage capacity will be needed once CR-1B reaches capacity. Efforts will be made, to the extent practicable, to minimize the degree of impact to Waters of the United States; however it is likely that the footprint and impacts associated with the future site will be within the range of values observed for coarse coal refuse disposal area CR-1B. It is not anticipated that the additional disposal area will be needed for approximately 14 years from the time CR-1B starts to accept refuse.

8.4 EFFECTS OF STREAM AND WETLAND MITIGATION SITES

Many streams within the CIA area provide opportunities for mitigation due to the streams being degraded by recent and current intense agricultural, residential and other anthropogenic activities including deforestation of the riparian area and unrestricted live stock access to the streams. Construction and operation of the Foundation Mine Surface Facilities Complex will result in both temporary and permanent impacts of Waters of the United States. Although the entire CIA area is available for mitigation, FMLLC proposes stream/wetland mitigation sites along tributaries and mainstem streams within the same watershed as the project area (McCourtney Run watershed), both upstream and downstream of proposed mine surface facilities complex development activities. Refer to the proposed mitigation plan presented as Appendix F and discussed in Section 7.0 of this document.

8.4.1 Proposed Stream And Wetland Mitigation

8.4.1.1 Proposed Stream Mitigation Areas

To offset impacts to all three stream classes (perennial, intermittent, and ephemeral) FMLLC proposes a multi-faceted mitigation strategy. The proposed strategy uses both traditional stream restoration and stream creation activities to offset the perennial stream impact. It also includes headwater stream preservation efforts (being preserved in perpetual deed restricted conservation easements) to offset the intermittent and ephemeral stream impacts.

Traditional stream restoration/creation methods on mainstem perennial streams within and adjacent to the surface facilities complex will be in Garner Run, House Run and tributaries, and McCourtney Run and tributary. The Hoge Run relocation will be reconstructed using Natural Stream Channel design principles. To offset perennial stream impacts totaling 30,708 linear feet, FMLLC proposes to provide multifaceted, watershed-wide stream restoration and riparian buffer enhancements that will restore stream corridors impacted by current/recent agricultural and residential activities as discussed in the proposed mitigation plan (Section 7.0 and Appendix F). A total of 48,600 linear feet of perennial stream mitigation is proposed.

To offset anticipated impacts to 18,456 linear feet of ephemeral and 5,218 linear feet of intermittent streams, FMLLC proposes to provide 45,236 linear feet of headwater stream preservation within existing EV and HQ designated watersheds that are adjacent to, and contribute to, the project area mitigation streams. HQ preservation is proposed in three (3) sub-watersheds of Garner Run and EV preservation is proposed in five (5) sub-watersheds – three (3) in House Run and two (2) in Hoge Run.

8.4.1.2 Proposed Wetland Mitigation Areas

Of the forty-five (45) wetland systems present within the proposed project area, twenty-seven (27) wetlands totaling 1.499 acres will be partially or completely impacted by development of Foundation Mine Surface Facilities Complex. Twenty-five (25) will be completely impacted and two (2) will sustain partial impacts. The total wetland impact is anticipated to be 1.305 acres, which will include 1.278 acres of PEM wetlands, 0.010 acre of PSS wetlands, and 0.016 acre of PFO wetlands.

FMLLC proposes to create a total of 1.415 acres of replacement wetlands having combined Palustrine Emergent (PEM), Palustrine Scrub Shrub (PSS), and Palustrine Forested (PFO) habitat. The wetland mitigation plan provides an overall wetland replacement mitigation ratio of 1.08:1 (replacement acreage to impact acreage). The replacement wetlands will be constructed within the House Run watershed along the mainstem and a tributary. The varied planting zones and elevation ranges within and along the wetland edge will provide a mixture of aquatic

influences that are anticipated to provide functions and values at least equal to those currently provided by the impacted wetlands.

8.4.2 Cumulative Impact Assessment of Proposed Mitigation Projects

Since proposed mitigation measures will occur in the McCourtney Run sub-watershed of the CIA area, the benefit of mitigation not only will be experienced in the McCourtney Run watershed, but also in the Upper and Lower South Fork Tenmile Creek sub-watersheds located downstream.

Proposed headwater stream preservation will offset 5,218 linear feet of jurisdictional intermittent and 18,456 linear feet of jurisdictional ephemeral stream impacts. It will provide for preservation of 45,236 linear feet of headwater stream classified as follows:

Perennial -	5,603 LF
Intermittent -	10,552 LF
Ephemeral -	20,187 LF
Unclassified -	8,894 LF

The overall preservation ratio will be 1.91:1. Approximately 445 acres of forested watershed area also will be preserved in perpetual deed restricted conservation easement.

The 30,708 linear feet of jurisdictional perennial stream impact proposed with construction of the Foundation Mine Surface Facilities Complex will be offset by restoring 48,600 linear feet of mainstem perennial stream at a restoration ratio of 1.58:1. The proposed restoration/mitigation will provide livestock exclusionary stream fencing, stream bank restoration, stream bank stabilization, designated stable stream crossing areas, riparian vegetation enhancement, and bank erosion reduction which will result in positive effects to the water quality and integrity of the stream banks.

Proposed wetland mitigation will provide approximately 1.415 acres of mitigation area for 1.305 acres of wetland impacts including the replacement of wetland functions which are also expected to result in a positive effect to the water quality. Furthermore the wetland systems along with adjacent stream corridors and riparian buffer areas will be enclosed within a protective 3-wire conservation area fence which will be installed to prevent future disturbance to the wetland replacement and stream restoration. As a result, the entire riparian area will serve as an interconnected wildlife corridor that will provide uninterrupted transitional habitat between adjacent predominantly rangeland and forested compartments.

Implementation and construction of proposed mitigation measures are likely to result in some temporary stream disturbances due to in stream channel work, associated bank stabilization, earth moving and installation of in stream restoration structures. The type of temporary impacts that could arise include: temporary increases in sediment loading while in stream enhancements are being constructed/installed, temporary displacement of benthic and aquatic communities during construction, minor stream flow fluctuations while water sources are temporarily routed

to allow for in stream workings and minor erosion problems while reseeded/vegetated areas become established. Benthic communities are expected to re-colonize the available streambed substrates and habitat post-construction. The effects of temporary impacts will be minimized by implementing acceptable Best Management Practices, prompt stabilization of earth disturbances, and constructing during appropriate times of the year during low flow conditions. None of these impacts are likely to be long term or detrimental in nature.

FMLLC has taken into consideration all of the potential scenarios/issues that could arise as a result of mitigation activities and will continue to take all necessary, practical steps to ensure any disturbance to the aquatic resources within the proposed restoration areas and their associated watersheds will be addressed and corrected in the most practicable and timely manner in conformity with all applicable local, state and federal regulations and standards.

8.5 CUMULATIVE IMPACT ASSESSMENT SUMMARY AND DISCUSSION

The purpose of the proposed Foundation Mine Surface Facilities Complex is to provide Alpha Natural Resources (Alpha) and its affiliate Foundation Mining, LLC (FMLLC) the requisite means to mine, process, and transport to market high quality thermal coal from their existing Pittsburgh Seam reserves in order to meet the existing and future demands of coal for electric utilities and manufacturing industries. To accomplish this task, FMLLC has prepared this Cumulative Impact Assessment in support of the Section 404 Permit Application.

Alpha is one of the largest coal producers in the Greene County. Alpha and its predecessors, through their affiliates-Cumberland Coal Resources, LP and Emerald Coal Resources, LP, have been conducting mining operations in Greene and Washington Counties for the past 35 years and have been providing significant long term employment opportunities for residents of the neighboring communities. With their current mining operations in Cumberland and Emerald mines, Alpha has created approximately 1,500 direct full-time high paying jobs as well as additionally over 5,000 indirect jobs within the local region (according to a National Mining Association report additional 3.5 indirect jobs are created for each coal mining job) to provide supplies , support, and services for mining related operations. In addition to employment, Alpha's operations at Cumberland and Emerald mines provide nearly $10 million (estimated) annually in the form of Federal, state, and local income taxes, sales taxes, property and production taxes, and payroll taxes. It is anticipated that Foundation Mine operation will increase these tax revenue by as much as 30%.

Foundation Mining, LLC has devoted extensive efforts to site evaluation and alternatives analysis before selecting and proposing the optimum site for the Foundation Mine Surface Facilities Complex from an environmental point of view. Existing land use and stream and wetlands conditions within the CIA watershed were evaluated using relevant data developed from a combination of field investigation technique (within the McCourtney Run sub-watershed) and review of readily available published databases, studies, maps, and other reference documentation. Data indicate that, within the CIA area and the proposed project boundary, forested, agricultural, and developed/residential land uses dominate the riparian zones of most stream networks. It also is evident that that existing land use and stream conditions are closely

related with the greatest stream stressor – agricultural land use. According to the Greene County Comprehensive Plan, adopted 2008, agriculture has been increasing within the County with a modest (2%) rise in the number and size (presently approximately 161 acres on average) of farms. Agricultural land use, specifically active livestock pasturing/grazing and tilling along and within floodplain and riparian corridors, was identified as the most influential land use as it relates to detrimental effects on water quality and stream stability. As a result, FMLLC will focus and direct its present and future compensatory stream and wetland mitigation efforts to address streams and wetlands that are impacted by past and active agricultural operations.

Although construction of the Foundation Mine Surface Facilities Complex will result in unavoidable but limited stream and wetland impacts, the development and implementation of commensurable compensatory stream and wetland mitigation sites will offset the impacts to Waters of United States (WOUS) and reduce detrimental impacts to the watersheds from existing and past agricultural practices. Mitigation for stream and wetland impacts are proposed at minimum ratios of 1.58:1 and 1.08:1, respectively which exceed the requisite 1:1 (impact to mitigation) ratio established by the USACE. As such, it is anticipated that development of the Foundation Mine Surface Facilities complex, in conjunction with the proposed stream and wetland mitigation plan, will not result in significant impairment of the physical, chemical, and biological integrity of the McCourtney Run sub-watershed and so in turn the CIA watershed.

Section 9.0

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